BRITISH WEST INDIES
CENTRAL SUGAR CANE BREEDING STATION
BARBADOS

TWENTY-SIXTH

ANNUAL REPORT

1958–59

COMMONWEALTH MYCOLOGICAL
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TABLE OF CONTENTS

	Page
ADVISORY COMMITTEE & STAFF	3
INTRODUCTION	5
SUGAR CANE BREEDING — SEEDLING RAISING AND PRELIMINARY ELIMINATIONS	8
VARIETY TESTING	14
RESEARCH WORK	21
VARIETAL TRENDS IN CONTRIBUTING TERRITORIES	29
DISTRIBUTION OF VARIETIES TO CONTRIBUTING AND OTHER COUNTRIES	32
APPENDIX I	33
APPENDIX II	39
APPENDIX III	44

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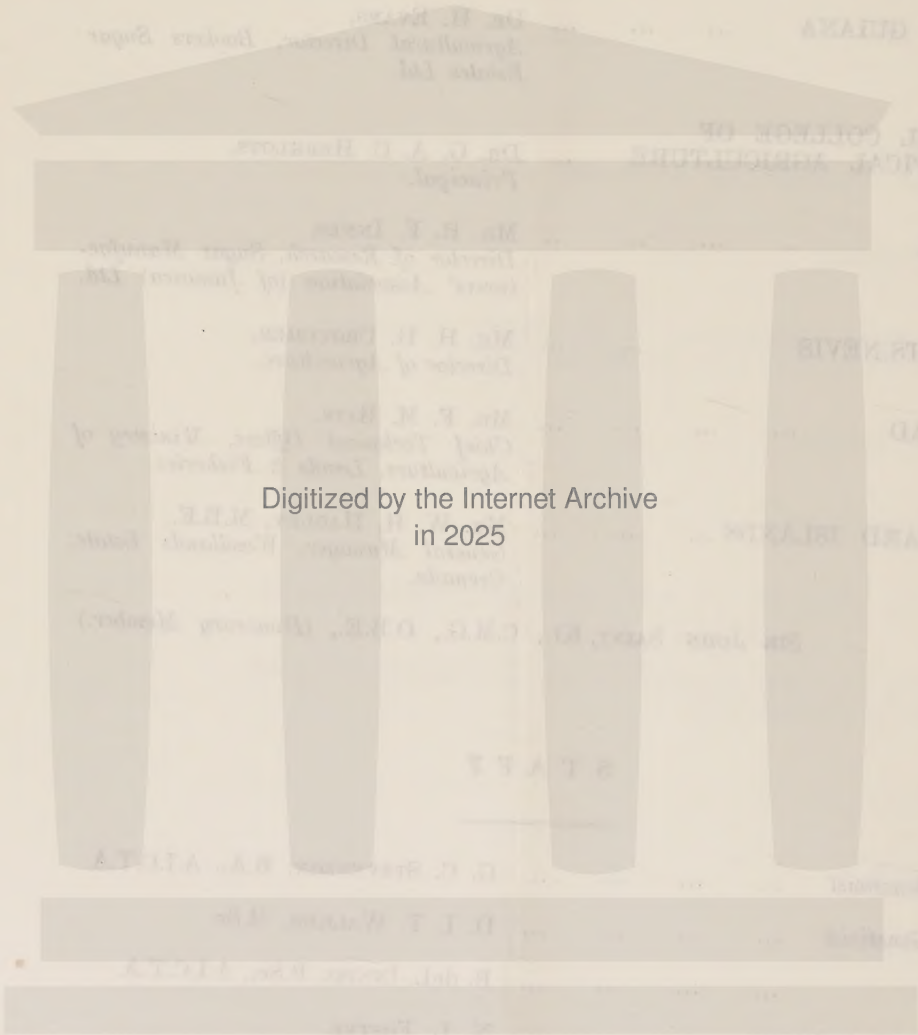

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British West Indies Central Sugar Cane Breeding Station Barbados

TWENTY-SIXTH ANNUAL REPORT FOR THE YEAR ENDING 30TH SEPTEMBER, 1959

INTRODUCTION

The sugar cane breeding season of 1958—59 was a very satisfactory one. Conditions for flowering were exceptionally good, and the programme which was carried out was the largest in the history of the Station. Details of it are given elsewhere in this report. The most important change from previous years was a considerable increase in the proportion of crosses made by the solution technique. For this, the organisation of collecting breeding canes and setting up the crosses is very different from that for the traditional lantern method, and valuable experience was gained.

Solution crosses were carried out in the new lantern batteries at Codrington, which proved to be convenient and successful. The 5-gallon enamelled containers, with drain plugs, were entirely satisfactory and resulted in a valuable saving of time and labour when changes of solution were made. Breeding canes were cut from the plots at Groves during the morning, and transported to Codrington by lorry. Provided ordinary care was taken in handling, there was very little breakage of arrows, and crosses were usually in position in the lanterns before midday. Under such conditions it was shown to be unnecessary to transport the breeding canes in water or preservative solution.

Each lantern in the batteries could be used more than once per season, since the seed-bearing arrows were removed to a ripening shed immediately after cessation of flowering.

Important construction work at the Codrington nursery during the year included the building of two additional, larger, lantern batteries, and the roofing of a 42-ft. x 50-ft. area of the potting cisterns. This roofed area will serve three useful purposes: as a larger and higher ripening area for pollinated arrows, as a collecting surface for rainwater used to prepare the preservative solution, and as cover for newly potted seedlings before they are placed in full sunlight. The small field laboratory at Codrington was also re-equipped and provided with a refrigerator for storage of stock acid solution used in the lantern batteries.

Fuzz from special polycrosses was produced for Jamaica and British Guiana, primarily as an insurance against poor germinations of fuzz from the regular crosses. The two polycrosses were so arranged that they included parent arrows of varieties which have given promising results commercially in Jamaica and British Guiana respectively.

Importations of breeding varieties during the year included four noble canes from the 1951 collecting expedition to New Guinea, the Australian varieties Cadmus and Sirius, the Indian variety Co. 603, and an interesting *barberi* type, Kalari. In addition, five Barbados varieties were received from Jamaica: these had been selected there from batches of nursery material sent for trial in 1949 and 1950. They will be included in the Barbados testing scheme for commercial varieties, sent to certain of the Station's contributors, and used for breeding in trial crosses.

Good progress was made in research projects ancillary to the breeding work and seedling raising. Particulars of these investigations will be found in the body of this report.

Both the Senior Geneticist and the Junior Geneticist visited Jamaica during the year, to inspect and discuss the work taking place there with seedlings raised from Barbados fuzz. Details of this work are published in the annual reports of the Research Department, Sugar Manufacturers' Association of Jamaica, and will not be considered here.

The Senior Geneticist visited La Romana Corporation in the Dominican Republic, under the terms of a new agreement negotiated in 1958 by which the Corporation receives greatly increased participation in the work of the Barbados Station, including the receipt of fuzz for seedling growing and testing there. It is a pleasure to record that full confidence is felt in the ability of the Romana research staff to carry out an efficient evaluation of the material received. Barbados varieties — particularly B.41227, B.4362 and B.43337 have given exceptionally good results at Romana, where they already occupy some 55,000 acres, and it seems likely that within a few years the whole of the Corporation's 125,000 acres of cane lands will be under Barbados varieties. The replacement of P.O.J.2878, still the major variety there, is long overdue.

The Tenth Congress of the International Society of Sugar Cane Technologists was held in Hawaii during May 1959. The Senior Geneticist attended this as a delegate of the B.W.I. Sugar Association, and presented a paper describing the results so far obtained in the inbreeding programme in Barbados. The opportunity was also taken to discuss pertinent questions in relation to sugar cane breeding and testing with geneticists from all parts of the sugar cane world.

The Station's work attracts many visitors. During the year it was a pleasure to show some of the work and discuss results with visitors from England, France, Spain, Mauritius, Puerto Rico, Martinique and the Dominican Republic. In addition, members of the research staffs from Jamaica and British Guiana were invited to attend a discussion in Barbados in April, when the year's breeding programme was being formulated. The Advisory Committee met in Barbados in December 1958.

As in previous years, close co-operation was maintained with the officers of the Barbados Department of Science and Agriculture, and a debt of gratitude is due to the Director and the members of his staff for facilities extended and assistance received.

Publications during the year were:—

(i) STEVENSON, G. C. — "Inbreeding with Sugar Cane in Barbados." *Proc. 10th Congress Int. Soc. of Sugar Cane Tech. 1959.*

(ii) STEVENSON, G. C. — "Report on a Visit to Hawaii for the Tenth Congress of the International Society of Sugar Cane Technologists, May, 1959". *B.W.I. Sugar Association Bulletin.*

(iii) STEVENSON, G. C. — "Report on a Visit to Central Romana Corporation, Dominican Republic, July, 1959." *Mimeographed.*

Sugar Cane Breeding – Seedling Raising and Preliminary Eliminations

(a) Breeding:

The weather was exceptionally dry at Groves Station during the first four months of the year, and the irrigation equipment was fully employed during this period. The rains started about the middle of May and continued until the end of the year. Arrowing was very profuse and some varieties flowered for the first time in many years. One hundred and twenty-three crosses were made, as well as twenty-six selfs and special crosses for the inbreeding programme. Ninety-six crosses were also made in solution at Codrington, using the new lantern batteries, as well as various polycrosses, the seed of which was sent to Jamaica and British Guiana.

(b) Seedling raising, potting and planting in the Field Nursery:

Germination was not as good as was expected, but a total of approximately sixty seven thousand seedlings was obtained from the seed of two hundred and forty three crosses, selfs and sib-crosses. It should be mentioned that all of the seed from the polycrosses and three-quarters of the seed from the other crosses, where the amount of seed warranted it, was sent to British Guiana, Jamaica and La Romana, from which a further one hundred and seven thousand seedlings were germinated.

Table I gives under group heads a list of the numbers of crosses made, the numbers of seedlings germinated and the numbers planted in the First Year Seedling Nursery, while Appendix I gives detailed information for each cross made.

TABLE I.

SUMMARY OF THE BREEDING PROGRAMME 1958—59 FOR THE B.61′ SERIES

GROUP	No. of Crosses	No. Germinated	No. PLANTED IN FIELD NURSERY	
			Singles	Bunches
S. officinarum	3	1,263	359	57
S. officinarum x S. spontaneum	15	5,264	1,910	401
S. officinarum x S. barberi	4	101	77	—
S. officinarum x S. spontaneum x S. barberi ...	122	42,603	14,674	2,681*
S. officinarum x S. sinense	8	109	100	—
S. officinarum x S. spontaneum x S. sinense ...	14	1,714	968	102
S. officinarum x S. spontaneum x S. barberi x S. sinense	31	9,638	2,872	743†
S. officinarum x S. spontaneum x S. robustum	3	890	611	—
S. officinarum x S. spontaneum x S. barberi x S. robustum	14	1,010	433	106
S. officinarum x S. spontaneum x S. barberi x S. sinense x S. robustum	2	1,044	388	120
S. officinarum x S. spontaneum x S. sinense x S. robustum	1	—	—	—
TOTALS	217	63,636	22,392	4,210
Selfs and sib-crosses in Research Programme	26	3,805	1,347	—
GRAND TOTALS	243	67,441	23,739	4,210

*In addition to the above, 382 two's were also planted for experimental purposes.

†An additional 289 two's were planted for experimental purposes.

It is worthy of comment that the programme incorporated a larger proportion of crosses using *S. sinense* derivatives than in previous years. This follows the observation that many of the seedlings selected from later-stage trials in the testing programme in recent years have been from *sinense* breeding lines.

(c) Planting the First Year Seedling Trial — B.60′ Series:

The seedlings of this series were bred in 1957, potted and planted in the Field Nursery in May 1958. In October 1958, the seedlings in the Field Nursery were examined and unsuitable types eliminated. The remainder 7,686 seedlings, were planted in the First Seedling Trial. As in recent years a stool of the standard variety — B.41211, was planted every fifth stool through the trial for purposes of comparison.

Table II gives under group heads, the numbers of crosses, the numbers of seedlings in the First Year Seedling Nursery and the numbers of seedlings in the First Year Seedling Trial. Detailed figures for each cross are given in Appendix II.

TABLE II.

SUMMARY OF NURSERY SELECTION 1958 FOR THE B.60′ SERIES

GROUP	No. of Crosses	No. PLANTED IN FIELD NURSERY		No. planted in First Year Trial
		Singles	Bunches	
S. officinarum	2	17	340	96
S. officinarum x S. spontaneum	18	2,121	1,127	633
S. officinarum x S. barberi	2	11	—	4
S. officinarum x S. sinense	1	7	—	5
S. officinarum x Erianthus Maximus	1	1	—	—
S. officinarum x S. spontaneum x S. barberi ...	105	13,390	9,690	5,165
S. officinarum x S. spontaneum x S. barberi x S. sinense	22	2,101	2,826	1,025
S. officinarum x S. spontaneum x S. sinense ...	5	283	150	96
S. officinarum x S. spontaneum x S. barberi x S. robustum	8	1,967	628	519
S. officinarum x S. spontaneum x S. robustum	2	2	186	131
S. officinarum x S. spontaneum x S. sinense x S. robustum	1	68	—	12
Polycross	2	30	—	—
TOTALS	169	19,998	14,947	7,686

Assuming a mean survival of two seedlings per bunch in the Nursery, the elimination percentage was 84.6. The figure for the previous season was 85.5.

(d) Reaping the First Year Seedling Trial — B.59′ Series:

The seedlings of this series were bred in 1956—57, potted and planted in the Field Nursery in May 1957 and into the First Year Seedling Trial in October, 1957.

There was no change in the selection methods. The seedlings were cut in February, cleaned, bundled and laid out for inspection. Selection was made initially on appearance, and was based to some extent on comparison with the neighbouring stools of the standard variety. After selection, the following data were taken:— (1) number of canes per stool; (2) number of rotten canes per stool; (3) percentage arrowing; (4) weight in lb.; and (5) Hand Refractometer brix readings. The latter readings were calculated as the means of samples from the middle of all millable canes in the stool, thus removing any bias on the part of the scaleman in choosing

canes for brix sampling. All canes from which data are taken are designated field selections. However, if the brix does not reach a certain standard, the seedling is discarded in the field. Later, a further selection is made after consideration of the Field Data. Any varieties which come through this stage are known as 'final selections', and are planted in multiplication plots with a view to their being put into Second Year Seedling Trials or the Breeding Plots during the planting season.

In this series two hundred and forty-eight final selections were made. B.49119, planted as a standard variety every fifth stool throughout the trial, gave the following average results:—

Canes per stool	22.9±	7.2
Lb. per stool	84.9±	30.6
Brix	22.0	

Bearing in mind that this variety tends to be from a small sample of stools, a strong competitor in small-plot trials, the performance of the standard variety was used as a guide to selection. Selected seedlings, in fact, contained 8 to 35 canes and weighed 40 to 140 lb. The lowest accepted brix being 19.5.

(e) Planting the Second Year Seedling Trials — B.58′ Series:

The two hundred and thirty-one seedlings of this series were multiplied in ten-stool plots at Codrington Experiment Station. Cuttings of all were sent to Jamaica, British Guiana and La Romana for selection under their conditions. A further selection reduced this number to one hundred and fifty-five varieties for planting in Barbados Second Year Trials. Although at this stage selection is on visual characters only, there is no doubt that it is a very useful step in the testing schedule. Since several stools of each variety are examined, those not up to standard (often by reason of exaggerated yield through environmental variation in the single-stool First Year Trial) can be eliminated before inclusion in formal replicated trials.

The Second Year Trials were planted using 9 stool plots and three replications with two standard varieties at high and low rainfall stations.

(f) Reaping the Second Year Seedling Trials — B.57′ Series:

The one hundred and twenty-one varieties of the B.57′ series were cut in Second Year Seedling Trials at the low rainfall station, Belle, and in a duplicate trial at the high rainfall station, Clifton Hall. Fifteen seedlings were selected in all. Nine will be tested further in Barbados, and two are for breeding purposes only. Selection at Clifton Hall was made difficult on account of severe rat damage, so that more than usual weight had to be given to the results from the low rainfall station.

The performances of the standards and the selected seedlings are given in Table III.

TABLE III

SECOND YEAR TRIALS — B.57′ SERIES — PLANT CANES

Low Rainfall Estate (L) ca. 60″ BELLE *Reaped 16th—19th February, 1959*

High Rainfall Estate (H) ca. 70″ CLIFTON HALL *Reaped 11th—14th March, 1959*

VARIETY	PARENTAGE	NO. CANES PER STOOL (ROTTEN)		ARROWING		REFRACTOMETER BRIX		TONS CANE PER ACRE	
		L	H	L	H	L	H	L	H
B.41211	Standard	14.5 (1.3)	—	3%	—	20.3	—	52.62	—
B.45151	Standard	—	17.0 (5.1)	—	5%	—	19.0	—	45.35
B.4744	Standard	15.7 (0.9)	21.0 (3.9)	2%	8%	21.5	18.6	59.35	77.24
B.5712	B.3439 x B.45151	111 (bad)	113 (bad)	nil	light	97	92	77	79
B.5736	B.4362 x B.39220	103 (slight)	100 (bad)	mod:	mod:	106	109	90	81
B.5743	B.4362 x B.50340	122 (mod:)	82 (bad)	nil	light	101	96	98	67
B.5744	” x ”	132 (mod:)	84 (mod:)	light	light	97	89	101	71
B.5745*	” x ”	152 (slight)	132 (bad)	mod:	heavy	99	87	90	94
B.5787	B.45154 x B.49119	103 (slight)	125 (bad)	light	light	102	98	95	85
B.5789	” x ”	114 (slight)	168 (bad)	nil	light	93	93	105	99
B.5791	” x ”	120 (slight)	149 (mod:)	nil	mod:	102	104	81	98
B.57133	B.5041 x B.4744	125 (mod:)	56 (bad)	nil	light	102	100	89	73
B.57138*	B.5061 x B.4098	106 (slight)	75 (serious)	nil	light	101	97	93	40
B.57141	B.50196 x B.4098	74 (mod:)	99 (serious)	nil	nil	100	104	80	79
B.57146	B.50210 x B.4098	105 (slight)	132 (bad)	nil	light	105	101	99	96
B.57150	B.51311 x B.4098	108 (slight)	87 (serious)	nil	mod:	113	101	99	41
B.57156	B.51311 x B.4738	69 (slight)	102 (serious)	light	mod:	99	101	66	71
B.57176	P.R.1000 x B.4098	94 (slight)	116 (bad)	mod	heavy	98	104	73	70

* for breeding only.

N.B. Nearly all plots at Clifton Hall had been damaged by rats.

Performances of standards are given as averages of all groups involved. Those of selected seedlings are given as percentages of B.4744 in their own group. Arrowing is not closely compared with standards, but is grouped as follows:—nil; 1—10% light; 11—25% moderate; over 25% heavy. Rotten cane is similarly grouped as less than 5% slight; 5—10% moderate; 11—20% bad; over 20% serious. The rainfall quoted is that received by the crop for the 16-month growing period—

(g) Seedlings of the B.56′ Series — Second Year Seedling Trials — First Ratoons:

The seedlings of this series were cut as first ratoons in Second Year Seedling Trials at the high rainfall station, Hothersal. They were not very outstanding, and only five were selected from the plant cane trial. Two of these were very poor as ratoons, and they have been discarded. No Third Year Seedling Trials were planted. The yields of the standards and selected seedlings are given in Table IV.

TABLE IV.

SECOND YEAR TRIAL — B.56′ SERIES — FIRST RATOONS

HOTHERSAL ca. 70″ Reaped 18th—20th March, 1959

VARIETY	PARENTAGE	NO. OF CANES PER STOOL (ROTTEN)	ARROWING	REFRACTO-METER BRIX	TONS CANE PER ACRE
B.4744	Standard	16.9 (0.5)	1%	21.4	54.85
B.49119	Standard	25.2 (0.4)	3%	21.3	68.91
B.5610	B.3439 x B.45236	104 (slight)	light	100	63
B.5660	B.45170 x B.4744	144 (mod.:)	nil	106	90
B.5686	S.45 x B.41227	103 (slight)	light	102	84
B.5695	B.4145 x B.4788	91 (slight)	nil	99	67
B.56102	B.44111 x B.4098	103 (mod:)	mod:	97	82

For explanation see notes below Table III

Variety Testing

(a) Third Year Seedling Trials:

These trials are intended to screen the selections of each series more extensively, so that any which come up to the performance of the standard varieties may be considered for final testing in Select Seedling Trials, and for commercial cultivation in Barbados. The layout of these trials takes the form of six randomised blocks, with a plot size twenty cane holes, or approximately 1/87th of an acre. Sample bundles are taken from two of the six blocks for sucrose in juice determinations. This is the first stage at which mill data are recorded in the testing schedule.

(i) Plant Cane Trials — B.55′ Series

Only one variety of the B.55′ series, B.55258, gave yields exceeding those given by the standard varieties, and the juice of this variety was so poor that it cannot be considered for commercial cultivation.

(ii) First Ratoons — B.54′ Series

Table V gives the performances of the varieties which are worthy of mention. Full data will be presented at the conclusion of the second ratoon trials. Plant cane results were presented in last year's report.

The year 1958 was characterised by a very dry period during the first four months, and good rains thereafter. Reasonable rainfall during the first three months of 1959 resulted in conditions conducive to good ripening, and the juice quality was good.

Part of the field carrying the trial at Staple Grove was burnt when the young shoots were growing again, and the results of this trial are not as accurate as they might have been. The trial at Pickerings was also burnt when the ratoon shoots were well advanced, and the field was ploughed out by the plantation. The variety B.49119, which was used as a standard in these trials, is exceptionally vigorous and tends to crowd out its neighbours, particularly in the ratoon crops. These facts should be taken into account in considering the ratoon trial results.

Interesting varieties at this stage of the B.54′ series trials include:—

B.5401 (B.3439 x B.3337). A medium width, clean erect red cane with a yellow root ring. Ratooned well, particularly in the high rainfall areas. Its greatest defect appears to be the freeness with which it flowers, which limits its yields.

B.5480 (B.37172 x B.4098) This variety was outstanding as a plant cane, but in the small-plot trials so far reaped, has not proved to be a very powerful ratooner. Its juice quality is quite satisfactory.

B.54142 (B.44341 x B.3337). This variety is a heavy recumbent type of very good juice quality. It has ratooned exceptionally well, especially in the high rainfall areas and on the heavy valley soils. Its main defects appear to be its open growth habit, and a poor fall of trash.

TABLE V.

THIRD YEAR SEEDLING TRIALS — B.54′ SERIES

First Ratoons 1959

Plantation	Spencers	Staple Grove	Buttals	Orange Hill	Todds
Soil Type (Turner) ...	IIa	IIb	IVb	IIc	IIc
Reaping Date ...	20th Feb.	31st March	2nd April	3rd Feb.	20th March
Rainfall	ca. 45″	ca. 60″	ca. 60″	ca. 60″	ca. 60″
VARIETY	TONS CANES PER ACRE				
B.41211 Standard	41.46	35.24	—	—	—
B.4744 Standard	—	—	44.00	45.01	45.47
B.49119 Standard	51.09	48.85	47.12	54.13	64.18
B.53164	28.64	33.90	41.96	39.02	44.31
B.5401	37.97	35.77	39.58	43.53	50.50
B.5480	33.10	34.31	37.68	36.00	42.09
B.54142	32.74	32.43	47.15	44.68	51.46
B.54163	41.43	32.11	36.86	41.08	40.94
B.54172	33.49	35.59	35.96	32.94	30.80
B.54277	37.18	37.06	42.98	46.51	39.57
	PERCENT SUCROSE IN JUICE (PURITY)				
B.41211 Standard	17.9 (85.7)	19.8 (91.4)	—	—	—
B.4744 Standard	—	—	18.4 (89.4)	17.4 (91.1)	18.5 (91.4)
B.49119 Standard	20.0 (89.5)	20.8 (92.0)	19.3 (91.0)	18.0 (91.9)	18.1 (91.6)
B.53164	19.8 (87.6)	21.5 (92.4)	19.2 (89.3)	17.2 (87.3)	19.2 (88.8)
B.5401	20.3 (91.0)	20.6 (92.4)	19.9 (92.1)	19.4 (92.0)	19.7 (92.2)
B.5480	18.8 (87.7)	21.1 (93.6)	19.7 (94.2)	17.2 (91.9)	18.0 (91.6)
B.54142	20.1 (90.6)	20.8 (93.2)	20.2 (92.6)	19.0 (93.4)	19.7 (92.8)
B.54163	21.3 (91.6)	21.7 (93.1)	20.1 (92.0)	18.5 (91.3)	20.1 (92.5)
B.54172	20.2 (91.8)	20.5 (92.7)	19.1 (92.5)	16.8 (91.4)	18.1 (92.7)
B.54277	20.1 (91.5)	19.5 (91.5)	19.2 (91.0)	18.0 (90.9)	18.3 (90.9)
	NUMBER OF ROTTEN CANES PER PLOT				
B.41211 Standard	9	15	—	—	—
B.4744 Standard	—	—	9	4	9
B.49119 Standard	7	9	6	7	10
B.53164	3	6	7	1	4
B.5401	5	11	19	7	16
B.5480	4	11	8	5	14
B.54142	6	20	6	3	5
B.54163	3	9	12	2	9
B.54172	8	11	12	2	12
B.54277	5	13	2	1	8

B.54277 (B.44341 x B.3337) gave good yields in the low rainfall area, and on the valley soils. It has ratooned quite well, has a very good juice, and the canes are medium width, semi-erect and free trashing.

The varieties **B.53164** and **B.54172** gave relatively poor ratoon yields.

The varieties **B.5401, B.5480, B.54142** and **B.54277** will be tested in Select Seedling Trials.

(iii) B.53′ Series

None of the varieties of this series was considered to be worthy of further trial, and they were not cut as second ratoons.

(b) Select Seedling Trials:

(i) Plant Canes

In these trials, the layout is in the form of 4 x 4 or 5 x 5 latin squares, with a plot size of approximately 1/40th of an acre. In the plant cane trials the varieties B.50112, B.5213, B.52107 and B.52298 were being tested against the standard varieties B.41211, B.45151, B.4744 and B.49119. A summary of these trials is given in Table VI.

In the low rainfall area trial, B.41211 gave the heaviest yield of plant cane. The cane yield of B.50112 was not as good as those of B.41211 and B.49119, but the sugar yields of all three varieties were approximately the same. The varieties B.5213 and B.52298 were outclassed in this trial.

In the intermediate rainfall areas, B.4744 gave the heaviest yield of cane but was not significantly better than B.52298. However, it significantly outyielded all other varieties on sugar at Foursquare. At Hanson all cane and sugar differences were insignificant. This was probably due to severe flooding soon after planting, which resulted in a very poor original strike. This was particularly true in the case of B.52298, which had to be replanted.

On the valley soils, there was no significant difference between the mean cane yields of B.4744, B.49119, B.50112 and B.52298. However, the first three listed all proved to be better than B.52298 and B.5213 on sugar.

In the trials in the high rainfall areas, B.52298 performed well at both stations, giving good yields of cane. The juice quality, however, was inclined to be poor. B.52107 was outstanding at Hothersal, giving the heaviest yields of cane and sugar, but suffered severely from rat damage at Portland. As the canes of this variety are very long and thick, the damage was particularly severe. B.50112 was disappointing in both trials.

It was noticeable that the varieties B.50112 and B.52298, which produced very few arrows in the Third Year Seedling Trials, were flowering freely in the Select Seedling Trials. The planting material had been heat treated against ratoon stunting disease, and excessive flowering is attributable to this. It was a great disappointment, as both varieties had been expected to perform well. If untreated material of these varieties can be located, it will be used for further trials.

TABLE VI.

SELECT SEEDLING TRIALS — PLANT CANES

Plantation	Friendship	Hanson	Four-square	Bulkeley	Portland	Hother-sal
Soil Type (Turner)	IIa	IIb	IIb	IVb	IIc	IIc
Reaping Date / *Rainfall*	5th March ca. 53″	9th March ca. 65″	25th Feb: ca. 53″	24th March ca. 67″	4th March ca. 62″	10th March ca. 75″
TONS CANE PER ACRE						
B.41211 Standard	49.73	—	—	—	—	—
B.45151 Standard	—	—	—	—	48.70	47.09
B.4744 Standard	—	41.46	50.43	38.97	50.44	51.83
B.49119 Standard	46.28	40.43	42.63	39.68	—	—
B.50112	43.18	38.34	42.84	39.77	43.55	44.06
B.5213	36.63	36.72	42.29	31.45	—	—
B.52107	—	—	—	—	43.07	54.64
B.52298	39.14	32.41	47.65	36.50	53.55	53.18
TONS SUGAR PER ACRE						
B.41211 Standard	6.05	—	—	—	—	—
B.45151 Standard	—	—	—	—	7.44	6.66
B.4744 Standard	—	5.48	7.08	5.50	7.20	6.72
B.49119 Standard	6.35	5.89	6.34	5.77	—	—
B.50112	6.15	4.89	5.98	5.57	6.56	5.66
B.5213	4.89	4.56	5.51	3.94	—	—
B.52107	—	—	—	—	6.06	7.09
B.52298	4.83	4.37	5.37	4.90	7.51	6.58
PERCENT SUCROSE IN CANE						
B.41211 Standard	14.3	—	—	—	—	—
B.45151 Standard	—	—	—	—	16.0	15.2
B.4744 Standard	—	14.5	15.5	15.5	15.4	14.3
B.49119 Standard	15.5	15.8	16.3	15.9	—	—
B.50112	15.8	14.3	15.5	15.5	16.1	14.3
B.5213	14.9	13.8	14.5	14.1	—	—
B.52107	—	—	—	—	15.1	14.3
B.52298	14.3	15.0	13.9	15.3	15.4	13.7
QUOTIENT OF PURITY						
B.41211 Standard	85.4	—	—	—	—	—
B.45151 Standard	—	—	—	—	95.0	93.3
B.4744 Standard	—	90.9	90.2	91.0	93.1	90.7
B.49119 Standard	88.8	92.2	91.0	91.3	—	—
B.50112	90.1	88.5	90.0	90.1	93.7	89.9
B.5213	89.5	89.6	89.6	88.4	—	—
B.52107	—	—	—	—	93.5	91.0
B.52298	84.7	89.9	81.1	87.5	91.1	89.9
NUMBER OF ROTTEN CANES PER PLOT						
B.41211 Standard	57*	—	—	—	—	—
B.45151 Standard	—	—	—	—	21	51*
B.4744 Standard	—	27	60*	60*	25	36
B.49119 Standard	38	21	50*	80*	—	—
B.50112	51*	40	59*	78*	29	47*
B.5213	65*	20	86*	79*	—	—
B.52107	—	—	—	—	54*	25
B.52298	84*	16	75*	65*	36	42
Sig. Diff: Cane	±4.14	Insignificant	±4.93	±3.30	±5.48	±2.90
P=0.05 Sugar	±0.53	Insignificant	±0.58	±0.46	±0.91	±0.72

*Damaged by rats.

(ii) Second Ratoons

Six select seedling trials testing B.49119 against existing standard varieties were concluded in 1959. The results are summarised in Table VII and Figure I.

Tonnage of cane. In the low rainfall area B.49119 outyielded all varieties at River, and was not far below B.41211 and B.4744 on heavier soils at Vineyard. In an intermediate rainfall trial at Frere Pilgrim it yielded rather less than B.4744, and the same was true of the Boarded Hall trial in deep heavy valley soils. In the high rainfall area trials it did not compete with B.4744 at Castle, probably on account of free arrowing, but at Cottage on heavier soils its yield approximated to those of B.41227 and B.4744. A premium was put on freedom from rotten cane at Cottage owing to the late date of reaping under the adverse conditions in the 1958 crop.

Ratooning capacity. Figure I indicates clearly the tendency for B.49119 to ratoon more strongly than the other varieties in all trials. This was particularly true when comparing it with B.41211 under drought conditions, and B.4744 in all trials. The advantages of B.49119 will not be fully evident until fields are kept for five or six crops.

Rotten canes and percent fibre. B.49119 is a high fibre cane, and this is reflected in its resistance to rotting. In several trials, differences in rotting could account for a large part of the differences in yield. (The fibre percentages quoted are known to be rather higher than true values in the case of thin varieties, and are due to the milling technique used for these samples).

Juice quality. At all times the juice quality of B.49119 has been very satisfactory. The variety ripens early but does not deteriorate to the extent of other varieties, notably B.41211, in the face of unfavourable conditions.

Yields of sugar. Due to high fibre content the sucrose percent cane is somewhat lower than juice analysis would suggest. In dry areas and on thin soils B.49119 was as good as or better than any of the standards, and may replace B.41211 on these situations. On deep soils, B.4744 outyields it unless rotting is excessive, though this may not hold true when more than two ratoons are taken, and where arrowing is not excessive.

It should be noted from these trials that all other varieties outyielded B.37161. The high quality of B.41227 in these trials has suggested that it is a variety worthy of extension in estates where free arrowing is not a problem, or as a variety for early reaping. Both B.41227 and B.49119 may flower less freely in plant canes if not planted before mid November.

The status of B.49119 as a commercial variety is assured in all dry areas of the island, and in all areas where arrowing is not excessive it will be useful for its long-standing qualities for late reaping.

Commercial plantings reaped in 1959 already amounted to 11% of the Barbados acreage, and yields of cane were 107%, 117% and 111% of B.37161 in plant cane, first ratoon and second ratoon crops respectively.

TABLE VII.

SELECT SEEDLING TRIALS CONCLUDED IN 1959 — AVERAGE PERFORMANCES

For Plant Cane, 1st Ratoon and 2nd Ratoon Crops.

Plantation	River	Vineyard	Frere Pilgrim	Boarded Hall	Castle	Cottage	Mean
Soil Type	IIa	IIb	IIb	IVb	IIc	IIc	
Rainfall p.a.	ca. 60″	ca. 50″	ca. 60″	ca. 60″	ca. 60″	ca. 80″	
			Tons Canes per Acre				
B.37161	33.69	34.12	33.09	38.83	30.85	36.89	34.59
B.4098	—	39.90	34.66	—	—	—	—
B.41211	37.05	41.64	35.56	—	—	—	—
B.41227	37.96	—	—	41.89	36.29	44.94	—
B.45151	—	—	—	38.65	37.92	40.03	—
B.4744	36.83	40.51	40.98	46.39	40.75	44.10	41.59
B.49119	40.77	38.74	35.16	41.42	36.28	45.10	39.58
			Percent Sucrose in Cane (Purity)				
B.37161	13.3 (89)	14.4 (91)	14.5 (91)	14.1 (90)	14.5 (91)	13.7 (90)	14.1 (90)
B.4098	—	13.7 (85)	14.7 (89)	—	—	—	—
B.41211	13.7 (84)	12.8 (82)	14.1 (87)	—	—	—	—
B.41227	15.4 (88)	—	—	15.3 (90)	15.1 (88)	14.0 (88)	—
B.45151	—	—	—	15.6 (91)	15.9 (91)	14.9 (91)	—
B.4744	14.6 (87)	14.4 (86)	14.6 (89)	15.2 (89)	14.6 (86)	13.9 (89)	14.6 (88)
B.49119	14.4 (87)	14.2 (88)	14.6 (89)	14.4 (89)	14.5 (88)	13.6 (89)	14.3 (88)
			Percent Fibre in Cane (Rotten Canes per Plot)				
B.37161	17.1 (29)	16.7 (31)	16.6 (14)	15.6 (42)	16.9*(28)	16.3 (38)	16.5 (30)
B.4098	—	16.1 (33)	16.0 (18)	—	—	—	—
B.41211	15.3 (45)	15.1 (58)	15.6 (69)	—	—	—	—
B.41227	15.3 (38)	—	—	15.4 (39)	16.9*(43)	15.6 (29)	—
B.45151	—	—	—	16.4 (61)	17.8*(29)	16.7 (68)	—
B.4744	16.5 (26)	15.8 (14)	15.7 (20)	15.1 (34)	16.4*(21)	15.8 (53)	15.9 (28)
B.49119	17.8 (30)	17.7 (29)	17.6 (10)	16.7 (40)	17.5*(18)	17.7 (21)	17.5 (25)
			Tons Sugar per Acre				
B.37161	4.00	4.44	4.34	4.91	4.04	4.27	4.33
B.4098	—	4.61	4.20	—	—	—	—
B.41211	4.20	4.30	4.39	—	—	—	—
B.41227	5.06	—	—	5.61	4.79	5.35	—
B.45151	—	—	—	5.42	5.36	5.28	—
B.4744	4.58	4.95	5.21	6.09	5.14	5.29	5.21
B.49119	5.08	4.80	4.57	5.37	4.62	5.39	4.97
LSD (P=0.01)	0.72	N.S.	0.36	0.39	0.54	N.S.	

*Fibre samples from this trial were spoiled in the first ratoon crop. Figures are the means of plant cane and second ratoon.

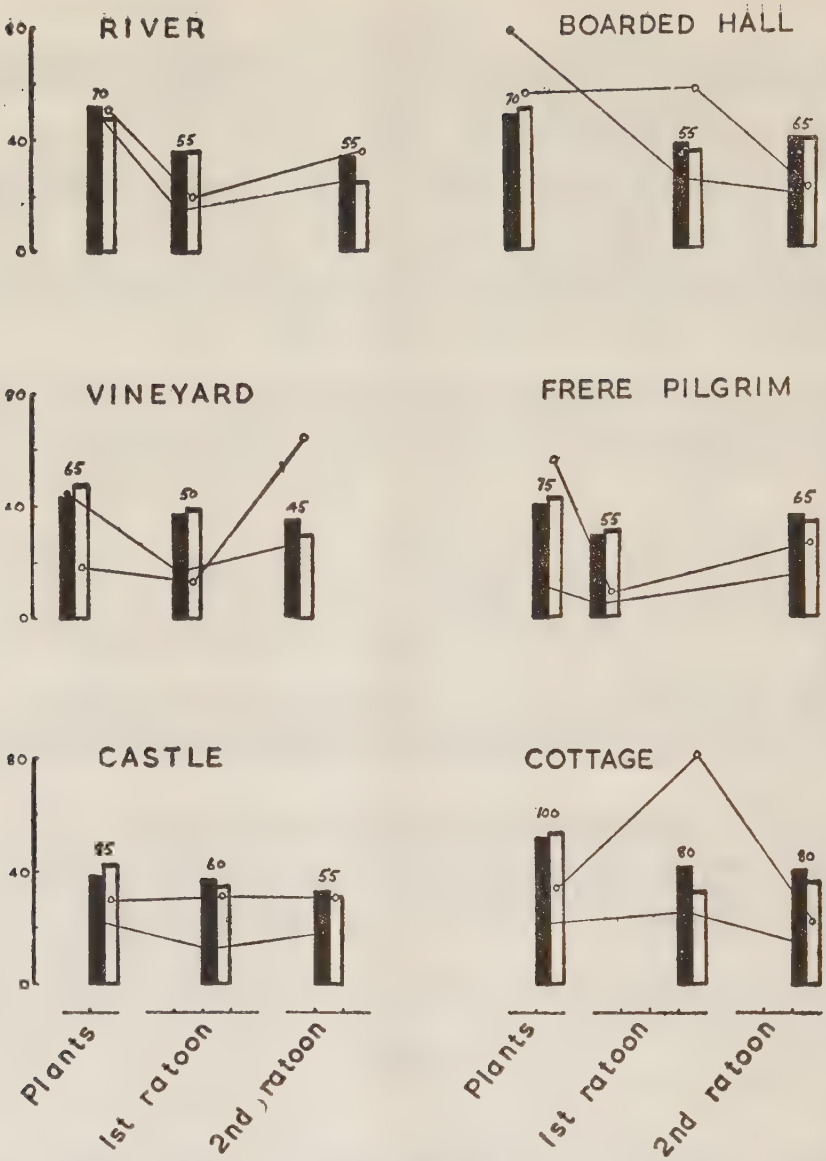

Figure 1.

SELECT SEEDLING TRIALS TESTING B.49119 — 1956—59.

Histograms:— tons cane per acre
solid — B.49119
open — mean of the four other varieties in each trial

Lines:— numbers of rotten canes per plot.

The figure above each histogram is the approximate rainfall received by the trial.

Research Work

I. The Inbreeding Programme:

The results of the inbreeding programme to date were presented in some detail in a paper read at the Tenth Congress of the International Society of Sugar Cane Technologists in Honolulu, May 1959. In this, emphasis was placed on the actual findings from experimental work, since it is the writer's conviction that further theoretical considerations, unsupported by such data, would be unprofitable.

Several selfs of the second, third and fourth generations from the foundation varieties B.3337, B.34104, B.35276 and B.4098 were selected for inclusion in the regular Second Year Trials. Others, from later series, as well as seedlings from crosses between selfs in different lines, and from top-crosses between inbreds and proven parent varieties, have passed through the Nursery First Year and multiplication selection stages in the routine trials schedule of the B.58′ and B.59′ series. While these seedlings represent but a small proportion of the total numbers under test, the results have been sufficiently encouraging to warrant an increase in the numbers of crosses in this research project for future programmes.

Further selfings were made during the 1958 breeding season in lines from the foundation parents B.3337, B.34104, B.35276, B.4098, B.41211 and B.44234. Nineteen selfings were made, in the second, third, fourth and fifth generations, and a new line was begun from B.43235, an attractive *officinarum* — *spontaneum* — *barberi* hybrid. Germinations were satisfactory on the whole, and more than thirteen hundred seedlings were planted in the Nursery.

In some of the selfed lines, populations in the fourth and fifth generations display appreciable variation in morphological characters, and in this respect differ from those in pure lines of maize and other diploid plants. An explanation for this behaviour is advanced below, in a consideration of the results of cytological studies. In other lines a remarkable degree of uniformity has been attained — so much so that sibling populations closely resemble clonal plantings. Examples of the latter are in the D and E lines, from B.41211 and B.3337 respectively.

Several inbred-crosses and top-crosses were made with the object of testing combining ability. The resulting seedlings, of which almost three thousand were planted in the nursery, will be subjected to the normal scheme of trials for production of commercial varieties. This testing of combining ability represents an important stage in the inbreeding work, since the usual selection criterion of weight per stool is not applicable to selfs beyond the first few generations on account of lack of vigour through increasing homozygosity. Selection is made, in fact, at this stage on the basis of growth type, freedom from undesirable cane characters (such as protruding buds, growth cracks, or procumbent habit) and juice quality.

It has been the experience that most of the individuals in the lines after several generations of selfing have rather thin canes, though there are notable exceptions. This merely means that loss of vigour is expressed by reduced cane thickness as well as reduced length. In general it would appear that tillering (and hence cane number) is little affected by successive generations of selfing. Hybrid vigour as a result of out-crossing results in restoration of normal cane thickness, so that there is no objec-

tion to the use of selfed parents with thin canes. Some of the heaviest and most attractive seedlings were selected from top-crosses with selfs in the D lines (from B.41211), whose canes are characteristically rather thin.

In the top-cross programme for testing combining ability, inbreds are used predominantly as males, since the great majority of them shed abundant pollen of normal appearance. Of the 171 selfed clones which arrowed during the 1958 season, 144 (or more than 84%) were male fertile. This ratio is much higher than for the outcrossed varieties of similar derivation in the main breeding plots, where roughly fifty per cent of the 400-odd breeding varieties are male-sterile. The high percentage of male-fertile clones in the inbred series is interpreted as a result of the automatic selection for meiotic regularity which takes place in successive generations of selfing.

Most of the selfs arrow more heavily than commercial varieties, though here again some are light arrowers, and a few have so far been non-arrowing. Results show, however, that heavy arrowing need not be a deterrent against using an inbred in top-crossing. Selections from such crosses do not show heavier arrowing than those from the general breeding programme. Many of them, in fact, were non-arrowing in the 1956—58 First Year Seedling Trial, carried out over the full 16-month Barbados plant cane growing season, although the inbred parents were heavy arrowers.

New projects in the inbreeding programme, which involve breeding systems less drastic than pure selfing, were begun. Selections were made in populations from crosses between P.R.1000 and B.47419, and between B.4733 and B.47419. Both these represent close inbreeding to P.O.J.2878 and Co.281, and it is the intention to continue this "closed population" breeding system over several generations in a scheme similar to that being used by Daniels in Fiji (Proceedings of 10th Congress, ISSCT, 1959).

II. Laboratory Work:

As in previous years, laboratory work was confined largely to somatic cytology. A satisfactory schedule for preparations used in establishing chromosome numbers in root tips was worked out some years ago, using pre-treatment in saturated aqueous a-bromonaphthalene solution followed by fixation in chrom-picricacetic formalin, dehydration through n-butyl alcohol series, embedding in wax, and sectioning on the microtome. While this is a time-consuming process, it has proved to be more reliable than any of the several methods based on the squash technique which have been experimented with. Further work was done during the year to evolve a suitable squash schedule, and some progress was made. Pre-treatment in colchicine solution in order to accumulate metaphases shows some promise, but a satisfactory time-temperature treatment has not yet been evolved.

Sugar cane roots grown from cuttings in water or moist air frequently become covered at the tips by a mucilaginous envelope. It has been found important to remove this carefully before processing, since it interferes seriously with the penetration of pre-treatment and fixative fluids. Improved penetration was also found to be effected by removal of the root-cap before treatment.

Chromosome numbers were established for several more individuals in the selfed lines. The results corroborated those reported last year concerning the pattern of chromosome behaviour on successive generations of selfing in aneuploid material. Meiotic regularity is not to be expected in a few generations, but is essential where there is any considerable degree of homozygosity in a selfed line. Even in strict polyploids the rate of progress towards homozygosity by selfing is

expected to be much slower than in the case of diploids. The principles of the process are outlined by Fisher ("The Theory of Inbreeding", 1949) and by Parsons (Agronomy Journal, Vol. 51, No. 8, 1959). Where there is differential viability in favour of heterozygous genotypes, progress must be expected to be even slower.

Irregular mitotic divisions, resulting in large differences in chromosome numbers between cells of the same variety, which have been reported by workers in India and Mauritius, have not been found in the preparations made and studied in Barbados. Such apparent aberrations as have been observed are ascribed to inadequate squash preparations and attempts to count early anaphase figures.

Other laboratory investigations during the year were concerned mainly with questions of variety identification through stem epidermis patterns, hair groups and other morphological characteristics.

III. Seedling Characters:

MacIntosh in 1932 made some observations at this Station on differences in vigour among potted seedlings and found that heavy tillering seedlings tended to be selected as mature cane stools. A more careful correlation experiment was completed in 1959. Samples of 27 seedling populations (2,775 seedlings in all), potted as singles in 1957, were used. The number of shoots in each seedling was counted immediately after planting in the nursery in May 1957. At the selection in October 1957, the seedlings were identified again; the first year trial planted as single stools from the 398 selections was numbered accordingly. At reaping in February 1959, record was kept of cane number in all these stools, and any selections were identified. Any field selection from the first year trial can be traced back to a potted seedling with a known number of shoots. The results are shown in Table VIII. The crosses have been grouped as follows: Group 1 contains two crosses in which seedlings showed very little tillering in the pots, averaging less than two shoots per seedling. Selection among such uniform seedlings would clearly be inadvisable and inefficient, and these two crosses are therefore excluded from the general averages and conclusions. The remaining crosses showed higher tillering and more variability. Groups 2, 3 and 4 show differences of general standard, as measured by per cent selection (i.e. number of field selections in first year trial 1959 x 100/number in nursery at time of first selection, October 1957). Groups 2, 3 and 4 are averaged at the bottom of the table, weighted for the number of observations, and these figures give an idea of the correlation obtained over a typical range of crosses made in any year, the potted seedlings of which showed good tillering and variability in the 1957 season.

TABLE VIII

SEEDLING CHARACTERS CORRELATION EXPERIMENT

Potted 1957: Nursery selection 1957: First Year Trial, 1959

Cross	Average Shoots per Pot	Selection in Nursery	Average Shoots of Selections	Field Selection in 1st Year Trial	Numbers of field selections made from seedlings with shoots counted						Number Counted (Pots)
					1	2 or 3	4 or 5	6 or 7	8 or 9	10+	
1	2.00	19%	1.77	3.4%	3	2	–	0	–	–	149
2	1.75	25%	1.44	2.6%	4	0	0	–	–	–	155
3	4.38	7%	6.57	1.1%	0	0	0	1	0	0	94
4	4.55	6%	4.70	0.6%	0	0	0	0	0	1	155
5	2.35	9%	2.36	0.8%	1	0	0	0	–	–	127
6	8.13	3%	7.40	0.7%	0	0	0	0	1	–	150
7	2.11	15%	2.95	0.0%	0	0	0	0	–	–	144
8	2.40	10%	1.64	1.0%	1	0	0	0	0	–	105
9	4.40	13%	4.16	0.7%	0	1	0	0	0	0	150
Sub-mean	4.75	9%	3.74	0.6%	1.03%	0.40%	0.00%	0.75%	1.28%	1.75%	(925)
10	3.54	12%	4.00	2.0%	0	0	1	0	0	–	49
11	4.58	19%	5.20	3.8%	0	0	0	1	0	0	26
12	3.09	21%	3.00	2.3%	0	0	1	0	–	–	43
13	3.53	10%	3.55	1.8%	0	2	0	0	0	0	110
14	3.82	11%	4.41	2.0%	0	1	1	1	0	–	148
15	4.71	19%	5.33	2.1%	0	0	0	0	0	1	48
16	3.16	24%	4.22	2.7%	0	0	0	0	1	–	37
17	5.45	13%	5.74	2.0%	0	0	1	0	2	0	147
18	4.69	11%	4.71	2.0%	0	1	1	1	0	0	149
19	2.57	17%	2.54	1.3%	2	0	0	0	0	–	150
20	3.40	16%	3.13	2.7%	0	1	1	2	0	–	150
21	3.64	16%	4.08	2.7%	0	1	2	1	0	0	148
22	4.17	14%	3.85	2.0%	0	0	2	1	0	0	147
Sub-mean	3.90	14%	3.99	2.1%	0.76%	1.58%	2.65%	2.94%	3.85%	6.67%	(1,352)
23	5.89	26%	4.80	5.3%	0	0	1	0	0	0	19
24	6.80	47%	7.57	6.7%	0	0	0	0	0	1	15
25	4.53	18%	4.43	7.9%	1	0	1	1	0	0	38
26	4.65	34%	5.04	6.3%	0	0	2	0	2	1	80
27	4.10	24%	3.20	7.1%	0	1	2	0	0	0	42
Sub-mean	4.80	29%	4.93	6.7%	3.85%	2.38%	11.11%	2.70%	8.33%	18.18%	(194)
Overall Means ...	4.29	13.6%	4.08	1.94%							
Total field selections					5	8	16	9	6	4	(48)
Possible selections (number potted)					483	675	641	409	180	83	(2,471)
Proportiom					1.04%	1.19%	2.50%	2.20%	3.33%	4.82%	
Expected frequency of field selections					9.3840	13.1136	12.4512	7.9440	3.4944	1.6128	(48)

Considering the first four columns of data, it can be seen that the first (nursery) selection did not favour the heavy tillering seedlings overall. In families of poor standard this was particularly true. Explanations in some cases are obvious, e.g. in cross number 6 (Co.413 x B.49119) where tillering was heavy but most canes were too thin for selection; the few thicker selections were lower tillering seedlings. In crosses of better average standard there is slight evidence overall that high-tillering seedlings are selected more frequently, but since some families are in direct contradiction to this, the nursery selection gives us no evidence that selection in pots would be a useful general procedure for all families.

This argument obviously assumes that the nursery selection procedure is reasonably, and uniformly, efficient. This assumption may not be correct, especially where vigour characteristics are concerned, but a general observation on the efficiency of the selection routine is the fair linear relationship between nursery selection and per cent field selection. Both selective stages take into account qualitative characters, however, which in certain crosses may take precedence as selection criteria and hence confuse the correlation.

The data from the first year trial field selection has been expanded by grouping the observed shoot numbers under:—

1. — leading shoot only;
2 and 3. — leader plus first rank tillers, etc.

The overall correlation between shoot number in seedlings and cane number in this trial is not of interest for selection, since the differences *between* crosses for shoot number have genetic determinants outside the scope of this experiment. Within crosses the correlation cannot be determined accurately from nonreplicated small numbers of seedlings. The percentage field selection is used instead, this being based on visual examination of growth characteristics — length, cane number, thickness — but not taking into account juice quality.

The number selected from each class of seedling is shown, a dash indicating that the class was not represented in the sample counted. The totals for each class of shoot number over the whole experiment provides expectations of the relative frequency of selections, assuming no relationship between shoot number and first year trial performance. As can be seen there is a tendency towards an excess of selections from higher-tillering seedlings, though x^2 for 5 d.f. $=10.52$ $P = 0.10$ to 0.05 indicates no significant departure; further, with such small expectations in some classes any significance is probably overestimated.

Compared with field selections in the ratio 1.04%: 1.19%: 2.50%: 2.20%: 3.33%: 4.82%, it may be noted that final selections (a more rigourous selection taking refractometer brix into account) gave the distribution — 0.41%: 0.59%: 1.40%: 0.98%: 3.33%: 3.61%. Thus these are more strongly associated with higher tillering in pots, though a *priori* one would not expect this. A further point noted was that any seedling with more than 10 shoots which survived the nursery selection also survived the final selection.

The most valid comparisons are made from crosses where all classes of tillering are represented — namely, 3, 4, 9, 11, 13, 15, 17, 18, 21, 22, 23, 24, 25, 26 and 27. In these we may expect selection to be most efficient if indeed a correlation exists. This selected set of crosses gave the following results:—

Observed frequency	1:	6:	12:	6:	4:	4	— Total 33
Expected ,,	4.34:	8.08:	10.35:	6.63:	2.56:	1.01	— Total 33

$x^2 = 12.72$ $P = 0.05$ to 0.02.

This cannot be considered a satisfactory level of significance on which to base firm statements, in view of the small class expectations, though the departure from expectation is rather more marked than in the entire data. Among these crosses the difference between, say, families 13 and 17 needs further investigation, but it is probable that in the nursery selection some more qualitative character is overriding vigour as a criterion.

In conclusion, there are slight indications that over all seedlings populations showing selectable variation for tillering in pots, selection at this stage will be correlated with first year trial performance. The correlation is not absolute, but may be a good guide for use where some reduction of numbers is necessary between potting and field nursery stages for reasons of space. It is most probably a better procedure than Finney's (1958) random discard method. Further, direct selection of this kind among singles may be preferable to "natural" selection among bunches.

Reference: FINNEY, D. J. "Plant selection for yield improvement". Euphytica **7** (1958) 83—106.

IV. Bunch Planting Experiments:

Experiments now in progress cover —

(i) survival of seedlings in bunches;

(ii) selection percentages, compared with singles and corrected for "horticultural" survival;

(iii) examination of growth habits of successful competitors both in seedling bunches and synthetic bunches of known varieties grown from single eye cuttings.

Reference: YANG, C. S. "A study on the competitive ability and yields among sugar cane varieties". Ann. Rep. Taiwan Sug. Exp. Sta. **16** (1957) 37—48.

V. Correlation Studies in Nursery Selection:

A co-operative study on a common set of families was begun in the nurseries planted in 1958 in Barbados, Jamaica and British Guiana. These are being scored for a range of commercial characters at each stage of selection, along the lines used by Skinner in Australia. An important feature is that the experiment is being carried out within the normal selection procedures used in the three contributing organisations, but it will point the way towards any alterations that should be made in the relative emphasis placed on characters at each selection stage where sugar yield cannot be determined accurately.

Further, a statistical measure of genotype environment interaction will be available. A character showing similar scoring in all nurseries and all crosses will be a reliable criterion when selecting for diverse conditions in one nursery. Other characters may show greater interaction of parentage with environment.

This study is intended as a check on the hypothesis that selection for a particular locality should be carried out in that environment. Taken to its logical conclusion, this hypothesis requires that nurseries should be established in all important cane environments, e.g. Jamaican irrigated estates, Jamaican north coast estates, Jamaican central estates and Jamaican east coast estates. If, however, the studies indicate that there are several characters consistent over all the nurseries involved,

the multiplicity of nurseries becomes unnecessary for selection efficiency, but merely expeditions in accommodating more seedlings per annum than can be housed in the present Barbados nursery.

Reference: Skinner, J. C. "Sugar cane selection experiments". 1. Bunch planting. Tech. Comm. Bureau Sugar Exp. Sta. Queensland, 1957, No. 1.

VI. Emasculation:

Much time was spent on developing the routine of the Hawaiian breeding method in the 1958 season, and emasculation experiments were only sketchy.

For heat treatment of arrows, the ratoon-stunting disease hot water treatment tank was adapted. In use, a full-length cane from Hawaiian solution, with a young arrow emerged or exposed by opening the sheath, was hoisted up by a pulley and the arrow lowered into the water for the requisite period.

Observations on the subsequent health and fertility of arrows of several varieties suggest that 48C. for 6 minutes is approaching the optimum time-temperature balance, though no seedlings have yet been raised from heated arrows. It is probable that satisfactory emasculation by one treatment will in any case be achieved in only a portion of the arrow, since the remainder of the flowers will not be at the critical stage of development.

A trial with Dowpon (2, 2 dichloropropionic acid), sprayed on to leaves and sheaths of standing cane (B.41227) shortly before arrow emergence, was attempted following work reported for cotton using similar substances. At 1% leaves were scorched, but pollen shedding was reduced markedly and delayed until late morning. At $\frac{1}{2}$% pollen shedding approached normal. Most of the arrows dried off before setting seed, and were inviable, at the higher strength. Dowpon sprayed direct on to young emerged arrow of canes in Hawaiian solution at 1%, caused similar drying off before seed had matured. It may be worth screening a range of similar compounds, if some are obtainable, in view of these results.

Reference: Eaton, F. M. (1957) Selective gametocide opens way to hybrid cotton. Science **126**, pp. 1174—5.

VII. Heat Treatment Effects:

The increase in arrowing, which appears a fixed characteristic of stocks multiplied after long hot water treatment, is of great interest. The first yield trial was reaped as first ratoons in 1959, and six trials involving the five major commercial varieties have been planted for reaping in 1960 and subsequent seasons. Measurements of early growth were made in one of these. A programme of repeated heat treatment, is being undertaken for experimental purposes. Q.28 is being used as an indicator variety in infection tests to see whether the arrowing has any relation to true ratoon stunting disease. Crosses with treated and untreated B.37161 and B.41211 in all combinations were made in 1958; the seedlings will be ready for examination shortly.

Current results available to date are summarised in Table IX.

TABLE IX.

Heat Treatment Trial

EDGECUMBE PLANTATION — PLANT CANES REAPED 19/2/58
4 x 4 LATIN SQUARE — 1st RATOONS REAPED 11/4/59

CROP	B.37161		B.41211		
	Treated	Untreated	Treated	Untreated	
P. C.	41.25	44.78	43.87	49.48	Tons cane per acre
1st Ratoons	36.82	38.94	36.62	30.86	Tons cane per acre
1st Ratoons	37.58	38.94	36.71	30.86	Corrected tons per acre
P. C.	56	4	20	4	% arrowing
1st Ratoons	9	0	1	0	% arrowing
P. C.	17.2	17.4	13.8	15.2	Sucrose in juice
P. C.	88.3	88.0	74.1	77.0	Purity
1st Ratoons	18.5	18.6	18.5	18.7	Sucrose in juice
1st Ratoons	90.7	91.1	88.1	89.4	Purity

By separating three types of cane at reaping time — (a) arrowed canes; (b) canes of similar type not arrowed; and (c) thin canes and late shoots — an estimate of the loss due to arrowing was possible in 1959, and the yields adjusted to exclude the effects of arrowing. The amount of flowering was much less than the plant cane crop in 1958, and incidentally much less than in the same varieties in estate fields nearby, but again showed the tendency of treated stocks to arrow more freely. The differences in tonnage were not significant in the ratoons, but in untreated B.41211 the drop in ratoons seems large, and may become more important in second and later ratoons. In the absence of significant differences in yield, it is not instructive to relate yield differences to arrowing or other factors.

Measurements of tiller length and tiller number were made on a portion of one trial in June 1958. Although very incomplete, there was some indication of differences in early growth. In B.37161, where we know heat treatment effects are present, plots of untreated stock showed more prolific tillering but shorter average length. Multiplied together "untreated" stools contained more cane at this stage than "treated" stools. If longer cane is present in this part of the growing season it is possible that more advanced canes would be present at the time of flower initiation, and hence more canes would arrow and cease growing in November. If, further, differences in tillering are real, more canes would be produced in treated plots and give a higher ultimate yield. The differences in arrowing could be explained in this way; the cause of different growth rates remains to be discovered.

Varietal Trends in Contributing Territories

Jamaica:

Figures available for the 1959 crop show that the industry is relying almost exclusively on B.41227 and B.4362. On the wet eastern estates, B.37172 is still an important variety, and Co. 331 is planted to some extent on the difficult soils of the dry north coast estates.

Variety per cent acreage figures for the 1958 and 1959 crops were:—

	1958	1959
B.41227	34	38
B.4362	25	30
B.42231	11	10
B.37172	6	5
B.34104	4	3
Co.331	–	3
B.37161	4	2

British Guiana:

B.41227 again shows an appreciable increase in acreage, and together with B.37161 accounted for more than three-quarters of the cane acreage for the 1959 crop.

Of the other varieties, B.47258 increased in popularity, particularly along the Demerara River banks and in Berbice. B.47225 again accounted for nearly 4,000 acres, largely in East and West Demerara and in Berbice.

Detailed figures for per cent acreages for the 1958 and 1959 crops were:—

	1958	1959
B.37161	42.9	39.0
B.41227	33.6	38.2
B.47258	5.8	7.3
B.47225	4.6	4.3
Pindar	2.6	2.4
B.4362	2.6	2.1
B.4098	3.1	1.9

Barbados:

Figures for the 1960 crop acreages show appreciable increases in the area under B.45151, B.4744 and B.49119. B.41211 also shows a slight increase in acreage. The old favourite B.37161, which occupied more than 90% of the island's cane acreage from 1948—50, is now planted only to a very insignificant extent. With four major varieties in cultivation, the variety picture in Barbados is at present a very satisfactory one.

Variety per cent acreages for the 1959 and 1960 crops are:—

	1959	1960
B.41211	24.03	25.78
B.4744	20.16	25.29
B.45151	13.67	18.03
B.49119	11.15	15.48
B.37161	22.06	7.99
B.4098	4.39	2.49

Trinidad:

Returns for the 1959 crop show a considerable increase in the area under B.41227, though this is accounted for largely by plantings on one group of estates. The other leading varieties, B.3337 and B.37172, both show a slight decrease in acreage. B.37161 acreage reaped was less than half that for the previous crop, and is now insignificant. One of the newer varieties, B.45224, now occupies a considerable acreage in the south of the island.

Per cent acreage figures are as follows:—

	1958	1959
B.41227	17.4	24.9
B.3337	26.8	24.5
B.37172	24.5	21.6
B.37161	23.8	10.3
B.45224	—	2.9

St. Kitts:

The main trends in St. Kitts for the 1960 crop have been a sharp decrease in the area under B.37161, and increases in those occupied by the newer varieties B.47419 and B.49119.

Detailed figures for variety per cent acreages for the 1959 and 1960 crops are:—

	1959	1960
B.41211	51.4	51.4
B.37161	29.3	18.2
B.45151	8.1	8.7
B.47419	2.1	5.4
B.49119	2.6	4.3
B.3337	2.3	2.4
B.34104	1.6	1.5

St. Lucia:

The main trends for the 1960 crop were moderate increases in the acreages under B.37172 and B.41227, mainly at the expense of B.37161, B.4362 and B.H.10 (12). Percentage figures for the major varieties were:—

	1959	1960
B.37172	57.5	61.4
B.37161	26.1	24.8
B.41227	2.8	4.6
B.4362	6.2	4.1
B.H.10(12)	4.5	2.6

Distribution of Varieties to Contributing and Other Countries

Jamaica ... ... B.603, Ba.11569, 28NG.13, B.35276, B.42304, B.43375 B.46103, Co.475, Co.678, Co.775, Co.991, Ragnar and Vesta

One cutting of each of the B.58′ series with the exception of B.58103 — B.58106 which were selected for breeding only and B.58158 and B.58214 which failed to germinate.

Trinidad, St. Kitts and Antigua: B.55227, B.55228, B.5660, B.5686, B.5695, and B.56102.

British Guiana: ... B.55227, B.55228, B.5660, B.5686, B.5695 and B.56102.

One cutting of each of the B.58′ series with the exception of B.58103 — B.58106, which were selected for breeding, and B.58158 and B.58214 which failed to germinate.

St. Vincent: ... B.50112, B.52298 and B.5480.

Grenada: ... ... B.5480 and B.54142.

Guadeloupe: ... B.52321, B.52371, B.5319, B.53164, B.5449, B.55227 B.55228, B.5660, B.5686, B.5695,and B.56102.

Martinique: ... B.55227, B.55228, B.5660, B.5686, B.5695 and B.56102,

Dominican Republic: ... B.5235, B.52144, B.52222, B.52313, B.5401, B.5480, B.5490 B.54142, B.54253, B.54362, B.53164, B.55227 and B.55228',

One cutting of each of the B.58′ series with the exception of B.58103 — B.58106. which were selected for breeding only, and B.58158 and B.58214 which failed to germinate.

The following breeding varieties were also sent:

B.603, Ba.11569, B.3353, B.3365, B.34102, B.35207, B.37172, B.37175, B.37193, B 39254, B.40123, B.4145, B.42304, B.4373, B.43283, B.43349, B.45152, B.45170, B.45237, B.45301, B.46136, B.47157, B.47320, B.48177 and B.50151.

St. Lucia: ... ... B.5557 and B.5579.

St. Croix via. Washington: ... B.52107, B.52222, B.52298, B.52313 and B.52321.

Nigeria: ... ... B.41227, B.4362, B.45151, N.Co.310 and Co.281.

Pakistan: ... ... B.37161, B.41227, B.4362, B.45151 and B.49119.

In addition to the above, the following shipments of 'fuzz' were made:—

Jamaica: ... ... 'Fuzz' from 33 polycross arrows and 135 crosses.

British Guiana: ... 'Fuzz' from 28 polycross arrows and 142 crosses.

Dominican Republic: ... 'Fuzz' from 137 crosses.

Morocco: ... ... 'Fuzz' from 3 crosses.

APPENDIX I.

SUGAR CANE BREEDING, SEEDLING RAISING AND FIELD NURSERY PLANTING 1958—59 — B.61′ SERIES

Details of Crosses made, their Germinations and Numbers Planted in the Field Nursery.

Cross	Group	No. Germinated	No. Planted In Field Nursery	
			Singles	Bunches
	S. officinarum			
Ba.11569 x Ajax ...	Noble	—	—	—
Ba.11569 x Badila ...	Noble	22	18	—
Ba.11569 x 28NG.13 ...	Noble	1,241	341	57
		1,263	359	57
	S. officinarum x S. spontaneum			
P.O.J.2364 x Comus ...	3rd Glagah Nobilisation	—	—	—
B.3439 x Eros ...	3rd Glagah Nobilisation	—	—	—
B.48361 x Comus ...	3rd Glagah Nobilisation	—	—	—
B.3439 x C.P.36—154	4th Glagah Nobilisation	84	56	—
M.134/32 x Badila ...	5th Glagah Nobilisation	800	444	—
Ba.11569 x Tabongo ...	1st Celebes Nobilisation	13	12	—
B.35247 x Comus ...	3rd Celebes Nobilisation	75	73	—
Otaheite x B.39246 ...	2nd Dacca Nobilisation	—	—	—
Co.421 x D.251 ...	Noble x Local x Glagah	3,649	746	401
Co.421 x D.2452 ...	,, x ,, x ,, ...	399	362	—
B.37172 x Pindar ...	,, x ,, x ,, ...	67	60	—
B.5041 x B.54142 ...	,, x ,, x ,, ...	151	137	—
Trojan x B.46364 ...	Local x Celebes x Glagah ...	20	15	—
B.51311 x B.46364 ...	,, x ,, x ,, ...	—	—	—
Trojan x B.49224 ...	Local x Dacca x Glagah	6	5	—
		5,264	1,910	401
	S. officinarum x S. barberi			
P.O.J.213 x B.391 ...	2nd Barberi Nobilisation	1	1	—
B.3365 x C.P.36—154	3rd Barberi Nobilisation	76	53	—
Ba.11569 x U.1124 ...	4th Barberi Nobilisation	22	21	—
B.37161 x Comus ...	4th Barberi Nobilisation	2	2	—
		101	77	—
	S. officinarum x S. spontaneum x S. barberi ...			
Ba.11569 x R.3321 ...	Noble x Local x Barberi	99	95	—
B.3013 x C.P.28—11	,, x ,, x ,, ...	241	201	—
B.37161 x Co.270 ...	,, x ,, x ,, ...	96	87	—
B.37161 x Co.313 ...	,, x ,, x ,, ...	8	8	—
B.37161 x C.P.28—11	,, x ,, x ,, ...	145	133	—
B.37161 x B.43229 ...	,, x ,, x ,, ...	—	—	—
B.45121 x Badila ...	,, x ,, x ,, ...	4	4	—
R.334 x U.112 ...	,, x ,, x ,, ...	17	9	—
H.32-8560 x B.37193 ...	Noble x Glagah x Barberi ...	881	316	109
M.134/32 x B.4362 ...	,, x ,, x ,, ...	1	1	—
M.134/32 x U.1221 ...	,, x ,, x ,, ...	8	6	—
M.134/32 x U.1421 ...	,, x ,, x ,, ...	19	19	—
P.O.J.3016 x B.41227 ...	,, x ,, x ,, ...	446	380	—
Ba.11569 x B.52107 ...	,, x ,, x ,, ...	329	314	—
Ba.11569 x J.31 ...	,, x ,, x ,, ...	1	1	—

APPENDIX I.—(*Continued*)

Cross	Group	No. Germinated	No. Planted In Field Nursery	
			Singles	Bunches
B.3439 x B.37193 ...	Noble x Glagah x Barberi ...	1,365	191	223
B.35207 x P.O.J.2878 ...	„ x „ x „	750	167	102
B.35207 x B.52107 ...	„ x „ x „	—	—	—
B.37161 x Eros ...	„ x „ x „	433	403	—
B.37172 x B.41227 ...	„ x „ x „	—	—	—
H.32–8560 x B.45109 ...	Noble x Glagah x Celebes x Barberi	53	51	—
H.32–8560 x B.46364 ...	„ x „ x „ x „	7	6	—
B.5012 x B.46364 ...	„ x „ x „ x „	14	6	—
B.37161 x B.49224 ...	Noble x Glagah x Dacca x Barberi	171	125	—
Co.421 x B.4098 ...	Noble x Local x Glagah x Barberi	234	197	—
Co.421 x B.47320 ...	„ x „ x „ x „	1,075	280	152
Co.421 x B.52107 ...	„ x „ x „ x „	1,590	450	215
F.36—819 x B.4098 ...	„ x „ x „ x „	239	204	—
F.36—819 x B.42231 ...	„ x „ x „ x „	6	4	—
F.36—819 x B.4362 ...	„ x „ x „ x „	11	11	—
F.36—819 x B.47314 ...	„ x „ x „ x „	10	4	—
F.36—819 x B.47380 ...	„ x „ x „ x „	38	31	—
F.36—819 x B.5480 ...	„ x „ x „ x „	29	16	—
D.62/43 x B.49119 ...	„ x „ x „ x „	184	177	—
H.32–8560 x N.Co.330 ...	„ x „ x „ x „	11	—	—
H.32–8560 x Pindar ...	„ x „ x „ x „	406	297	—
H.32–8560 x B.5121 ...	„ x „ x „ x „	6	5	—
M.134/32 x B.42231 ...	„ x „ x „ x „	6	4	—
M.134/32 x B.4738 ...	„ x „ x „ x „	—	—	—
M.134/32 x B.47314 ...	„ x „ x „ x „	—	—	—
Otaheite x B.4744 ...	„ x „ x „ x „	—	—	—
P.R.1000 x B.H.10(12)	„ x „ x „ x „	64	42	—
Trojan x B.49119 ...	„ x „ x „ x „	48	29	—
Trojan x B.52214 ...	„ x „ x „ x „	—	—	—
Ba.11569 x B.49119 ...	„ x „ x „ x „	—	—	—
Ba.11569 x Co.343 ...	x „ x „ x „	176	172	—
B.3172 x B.49119 ...	„ x „ x „ x „	20	16	—
B.3439 x B.4744 ...	„ x „ x „ x „	111	109	—
B.3439 x B.47314 ...	„ x „ x „ x „	—	—	—
B.3439 x B.49119 ...	„ x „ x „ x „	620	222	—
B.34102 x B.4744 ...	„ x „ x „ x „	148	127	—
B.34102 x B.47380 ...	„ x „ x „ x „	—	—	—
B.35207 x N.Co.330 ...	„ x „ x „ x „	14	14	—
B.35207 x D.251 ...	„ x „ x „ x „	68	50	—
B.37161 x Pindar ...	„ x „ x „ x „	1	1	—
B.37161 x B.4098 ...	„ x „ x „ x „	239	128	—
B.37161 x B.41211 ...	„ x „ x „ x „	1,622	645	148
B.37161 x B.4738 ...	„ x „ x „ x „	—	—	—
B.37161 x B.4744 ...	„ x „ x „ x „	2	2	—
B.37161 x B.4788 ...	„ x „ x „ x „	—	—	—
B.37161 x B.5480 ...	„ x „ x „ x „	—	—	—
B.37161 x C.413 ...	„ x „ x „ x „	60	51	—
B.37161 x C.4411 ...	„ x „ x „ x „	—	—	—
B.37161 x D.2451 ...	„ x „ x „ x „	95	88	—
B.37193 x B.41211 ...	„ x „ x „ x „	—	—	—
B.4096 x B.41227 ...	„ x „ x „ x „	127	106	—
B.40105 x B.49119 ...	„ x „ x „ x „	—	—	—
B.4214 x B.49119 ...	„ x „ x „ x „	164	151	—
B.4373 x Pindar ...	„ x „ x „ x „	6	6	—
B.4373 x B.42231 ...	„ x „ x „ x „	57	46	—
B.42231 x Self	„ x „ x „ x „	25	24	—
B.43358 x B.49119 ...	„ x „ x „ x „	379	300	—
B.45121 x B.4744 ...	„ x „ x „ x „	61	54	—
B.45137 x B.41227 ...	„ x „ x „ x „	3,310	341	360
B.45137 x B.48392 ...	„ x „ x „ x „	665	383	—
B.45137 x B.50382 ...	„ x „ x „ x „	5,152	498	217

APPENDIX I.—*(Continued)*

Cross	Group	No. Germinated	No. Planted In Field Nursery	
			Singles	Bunches
B.45137 x B.5121 ...	Noble x Local x Glagah x Barberi	386	361	—
B.45170 x B.4744 ...	,, x ,, x ,, x ,,	1,169	477	—
B.45225 x B.4744 ...	,, x ,, x ,, x ,,	4,515	425	250
B.47386 x B.4098 ...	,, x ,, x ,, x ,,	1,232	249	154
B.48209 x B.4744 ...	,, x ,, x ,, x ,,	3	3	—
B.48209 x B.54142 ...	,, x ,, x ,, x ,,	76	60	—
B.49119 x Comus ...	,, x ,, x ,, x ,,	198	198	—
B.49119 x B.34104 ...	,, x ,, x ,, x ,,	393	375	—
B.49282 x B.4098 ...	,, x ,, x ,, x ,,	39	31	—
B.5028 x B.43235 ...	,, x ,, x ,, x ,,	—	—	—
B.5041 x B.4738 ...	,, x ,, x ,, x ,,	20	16	—
B.5041 x B.49119 ...	,, x ,, x ,, x ,,	1,385	353	37*
B.50135 x Self	,, x ,, x ,, x ,,	473	313	—
B.51131 x Eros ...	,, x ,, x ,, x ,,	—	—	—
B.51131 x B.49119 ...	,, x ,, x ,, x ,,	—	—	—
B.52184 x B.34104 ...	,, x ,, x ,, x ,,	123	109	—
B.52222 x Co.270 ...	,, x ,, x ,, x ,,	50	47	—
B.52222 x B.43229 ...	,, x ,, x ,, x ,,	11	11	—
B.52389 x B.41227 ...	,, x ,, x ,, x ,,	185	158	—
B.52389 x B.52107 ...	,, x ,, x ,, x ,,	934	502	—
B.5336 x B.4098 ...	,, x ,, x ,, x ,,	1,192	205	61
B.54243 x B.41227 ...	,, x ,, x ,, x ,,	4	4	—
B.55258 x Eros ...	,, x ,, x ,, x ,,	—	—	—
B.5650 x B.4098 ...	,, x ,, x ,, x ,,	15	14	—
B.56104 x B.34104 ...	,, x ,, x ,, x ,,	—	—	—
T.11 x U.1131	,, x ,, x ,, x ,,	3	3	—
Co.421 x B.46265 ...	Noble x Local x Glagah x Celebes x Barberi	2,525	465	218
H.32-8560 x B.43375 ...	Noble x Local x Glagah x Celebes x Barberi	9	9	—
B.39157 x B.4744 ...	Noble x Local x Glagah x Celebes x Barberi	5	5	—
B.39157 x B.49119 ...	Noble x Local x Glagah x Celebes x Barberi	16	7	—
B.43380 x B.49119 ...	Noble x Local x Glagah x Celebes x Barberi	91	91	—
B.43283 x B.4747 ...	Noble x Local x Glagah x Celebes x Barberi	331	316	—
B.43283 x D.251 ...	Noble x Local x Glagah x Celebes x Barberi	491	305	—
B.48165 x B.4744 ...	Noble x Local x Glagah x Celebes x Barberi	11	10	—
B.50210 x B.46364 ...	Noble x Local x Glagah x Celebes x Barberi	1,470	270	235
B.50210 x B.49119 ...	Noble x Local x Glagah x Celebes x Barberi	1,349	148	200
B.52321 x B.43375 ...	Noble x Local x Glagah x Celebes x Barberi	355	278	—
B.52371 x B.34104 ...	Noble x Local x Glagah x Celebes x Barberi	163	140	—
B.52371 x D.251 ...	Noble x Local x Glagah x Celebes x Barberi	599	350	—
B.52371 x U.1122 ...	Noble x Local x Glagah x Celebes x Barberi	343	316	—
C.31 x B.46364 ...	Noble x Local x Glagah x Celebes x Barberi	157	133	—
B.4581 x B.4098 ...	Noble x Local x Glagah x Dacca x Barberi	10	10	—
Tukuyu No. 2 x B.41227 ...	Noble x Glagah x Tukuyu x Barberi	105	99	—
		42,603	14,674	2,681

APPENDIX I.—(*Continued*)

Cross	Group	No. Germinated	No. Planted In Field Nursery	
			Singles	Bunches
	S. officinarum x S. sinense			
Kavanjire x B.417	1st Sinense Nobilisation	—	—	—
Kavanjire x B.3915	,, ,, ,, ...	—	—	—
Merthi x B.391 ...	,, ,, ,, ...	1	1	—
Uba x B.603 ...	,, ,, ,, ...	3	3	—
C.H.64/21 x Ba.8069 ...	2nd Sinense Nobilisation	61	60	—
B.37226 x Ba.6032 ...	,, ,, ,, ...	22	20	—
B.37226 x B.3915 ...	,, ,, ,, ...	22	16	—
B.39254 x Badila ...	3rd Sinense Nobilisation	—	—	—
		109	100	—
	S. officinarum x S. spontaneum x S. sinense			
Trojan x H.32–1063	Noble x Local x Glagah x Sinense	4	3	—
Trojan x B.51152 ...	,, x ,, x ,, x ,,	22	16	—
B.40272 x Ebene 1/37	,, x ,, x ,, x ,,	—	—	—
B.441 x D.213 ...	,, x ,, x ,, x ,,	89	82	—
B.441 x B.46364 ...	Noble x Glagah x Celebes x Sinense	5	5	—
Otaheite x B.37261 ...	,, x ,, x ,, x ,,	—	—	—
Otaheite x B.51152 ...	,, x ,, x ,, x ,,	53	49	—
Otaheite x B.51269 ...	,, x ,, x ,, x ,,	181	110	—
Ba.11569 x H.32–1063	,, x ,, x ,, x ,,	—	—	—
Ba.11569 x B.35276 ...	,, x ,, x ,, x ,,	102	83	—
Ba.11569 x B.51152 ...	,, x ,, x ,, x ,,	—	—	—
Ba.11569 x B.51270 ...	Noble x Glagah x Sinense ...	20	17	—
B.45220 x C.P.36–154	,, x ,, x ,, ...	845	236	102
B.1125 x E.2411 ...	,, x ,, x ,, ...	393	367	—
		1,714	968	102
	S. officinarum x S. spontaneum x S. barberi x S. sinense			
B.37161 x B.47258 ...	Noble x Local x Barberi x Sinense	—	—	—
B.4214 x B.45151 ...	,, x ,, x ,, x ,, ...	1,018	249	50
B.45121 x B.45151 ...	,, x ,, x ,, x ,, ...	3,200	816	†190
B.45152 x Badila ...	,, x ,, x ,, x ,, ...	2	2	—
B.45152 x Co.270 ...	,, x ,, x ,, x ,, ...	175	175	—
B.45152 x B.3915 ...	,, x ,, x ,, x ,, ...	—	—	—
B.47329 x B.H.10(12)	,, x ,, x ,, x ,, ...	6	5	—
Ba.11569 x B.4543 ...	Noble x Glagah x Barberi x Sinense	174	135	—
Co.421 x B.45151 ...	Noble x Local x Glagah x Barberi x Sinense	1,546	386	219
D.62/43 x B.47258 ...	Noble x Local x Glagah x Barberi x Sinense	—	—	—
H.32–8560 x B.47258 ...	Noble x Local x Glagah x Barberi x Sinense	40	35	—
M.134/32 x B.47258 ...	Noble x Local x Glagah x Barberi x Sinense	51	25	—
P.R.1000 x B.47258 ...	Noble x Local x Glagah x Barberi x Sinense	1,950	600	133
B.37172 x B.47258 ...	Noble x Local x Glagah x Barberi x Sinense	30	25	—
B.39254 x B.4098 ...	Noble x Local x Glagah x Barberi x Sinense	12	12	—
B.40272 x B.4744 ...	Noble x Local x Glagah x Barberi x Sinense	124	112	—

APPENDIX I.—(*Continued*)

Cross	Group	No. Germinated	No. Planted In Field Nursery	
			Singles	Bunches
B.40272 x B.5480 ...	Noble x Local x Glagah x Barberi x Sinense	10	10	—
B.44341 x B.4362 ...	Noble x Local x Glagah x Barberi x Sinense	—	—	—
B.45152 x B.39220 ...	Noble x Local x Glagah x Barberi x Sinense	—	—	—
B.45152 x B.41227 ...	Noble x Local x Glagah x Barberi x Sinense	2	2	—
B.45152 x B.42231 ...	Noble x Local x Glagah x Barberi x Sinense	—	—	—
B.45152 x B.43214 ...	Noble x Local x Glagah x Barberi x Sinense	12	12	—
B.45154 x B.4098 ...	Noble x Local x Glagah x Barberi x Sinense	—	—	—
B.47329 x B.4022 ...	Noble x Local x Glagah x Barberi x Sinense	—	—	—
B.47399 x B.3337 ...	Noble x Local x Glagah x Barberi x Sinense	32	29	—
B.5060 x B.49119 ...	Noble x Local x Glagah x Barberi x Sinense	—	—	—
B.51129 x B.45151 ...	Noble x Local x Glagah x Barberi x Sinense	20	19	—
B.51167 x B.45151 ...	Noble x Local x Glagah x Barberi x Sinense	79	35	—
B.52321 x B.47258 ...	Noble x Local x Glagah x Barberi x Sinense	—	—	—
C.4411 x B.114 ...	Noble x Local x Glagah x Barberi x Sinense	—	—	—
B.50210 x B.47258 ...	Noble x Local x Glagah x Celebes x Barberi x Sinense	1,155	188	151
		9,638	2,872	743
	S. officinarum x S. spontaneum x S. robustum			
Otaheite x B.47156 ...	Noble x Celebes x Robustum ...	880	603	—
Trojan x 32 MQ.629	Noble x Local x Robustum ...	1	1	—
Trojan x B.4524 ...	Noble x Local x Glagah x Robustum	9	7	—
		890	611	—
	S. officinarum x S. spontaneum x S. barberi x S. robustum			
Ba.11569 x B.49203 ...	Noble x Local x Glagah x Barberi x Robustum	—	—	—
B.4092 x B.51242 ...	Noble x Local x Glagah x Barberi x Robustum	—	—	—
B.4096 x B.51242 ...	Noble x Local x Glagah x Barberi x Robustum	—	—	—
B.4214 x B.51242 ...	Noble x Local x Glagah x Barberi x Robustum	747	206	106
B.4455 x B.4098 ...	Noble x Local x Glagah x Barberi x Robustum	21	18	—
B.4523 x B.47419 ...	Noble x Local x Glagah x Barberi x Robustum	10	7	—
B.45117 x B.51242 ...	Noble x Local x Glagah x Barberi x Robustum	16	12	—
B.4862 x Badila ...	Noble x Local x Glagah x Barberi x Robustum	—	—	—

APPENDIX I.—*Concluded*

Cross	Group	No. Germinated	No. Planted In Field Nursery	
			Singles	Bunches
B.48357 x B.4744 ...	Noble x Local x Glagah x Barberi x Robustum	9	5	—
B.48357 x B.50135 ...	Noble x Local x Glagah x Barberi x Robustum	—	—	—
B.5651 x Co.290 ...	Noble x Local x Glagah x Barberi x Robustum	—	—	—
B.3439 x H.37–1933	Noble x Glagah x Barberi x Robustum	98	92	—
B.37161 x B.51242 ...	Noble x Glagah x Barberi x Robustum	108	92	—
A.133 x G.331 ...	Noble x Glagah x Barberi x Robustum	1	1	—
		1,010	433	106
	S. officinarum x S. spontaneum x S. barberi x S. sinense x S. robustum			
B.48306 x B.37193 ...	Noble x Glagah x Barberi x Sinense x Robustum	144	127	—
B.48306 x B.4098 ...	Noble x Local x Glagah x Barberi x Sinense x Robustum	900	261	120
		1,044	388	120
	S. officinarum x S. spontaneum x S. sinense x S. robustum			
B.48306 x B.3337 ...	Noble x Glagah x Sinense x Robustum	—	—	—
	Grand Totals ...	63,636	22,392	4,210

*Three hundred and eighty-two (382) two's were also planted from this cross.

†In addition an experimental planting of 289 two's were also made.

In all cases bunches consisted of five seedlings.

Excess seedlings were planted direct from the boxes into the field as turves or very large bunches.

APPENDIX II.

NURSERY SELECTION AND PLANTING OF FIRST YEAR SEEDLING TRIAL — B.60′ SERIES

List of Crosses and Number of Seedlings of each Planted in the Field Nursery (May 1958) and in the First Year Seedling Trial (October 1958)

Cross	Group	No. Planted In Field Nursery		No. Planted in First Year Seedling Trial
		Singles	Bunches	
	S. officinarum			
Ba.11569 x Comus ...	Noble	—	340	90
Otaheite x Badila ...	Noble	17	—	6
		17	340	96
	S. officinarum x S. spontaneum			
Tukuyu No. 2 x B.417 ...	1st Tukuyu Nobilisation	18	—	2
Ba.11569 x B.44131 ...	2nd Glagah Nobilisation	6	—	0
P.O.J. 3016 x B.3337 ...	3rd ,, ,, ...	—	171	13
B.37172 x B.3337 ...	4th ,, ,, ...	421	43	55
B.3439 x B.H.10(12)	4th ,, ,, ...	7	—	3
B.35247 x B.603 ...	3rd Celebes Nobilisation	68	—	20
Ba.11569 x Co.432 ...	Noble x Local x Glagah	69	—	12
P.O.J.2878 x B.52298 ...	,, x ,, x ,, ...	720	—	199
Co.421 x Comus ...	,, x ,, x ,, ...	275	—	33
B.5452 x B.41211 ...	,, x ,, x ,, ...	120	—	52
B.4145 x B.5301 ...	,, x ,, x ,, ...	25	—	12
Trojan x P.O.J.2878	,, x ,, x ,, ...	104	—	40
Trojan x B.41211 ...	,, x ,, x ,, ...	—	389	46
B.3439 x B.5301 ...	,, x ,, x ,, ...	3	—	1
B.3439 x B.53200 ...	,, x ,, x ,, ...	—	94	40
B.3439 x B.54193 ...	,, x ,, x ,, ...	267	—	61
B.3439 x B.46364 ...	Noble x Glagah x Celebes ...	—	430	36
B.48165 x B.603 ...	Noble x Local x Glagah x Celebes	18	—	8
		2,121	1,127	633
	S. officinarum x S. barberi			
B.35207 x 28 NG.13 ...	4th Chunnee Nobilisation ...	9	—	3
B.37161 x B.3915 ...	,, ,, ,, ...	2	—	1
		11	—	4
	S. officinarum x S. sinense			
Ba.11569 x B.35269 ...	2nd Sinense Nobilisation ...	7	—	5
	S. officinarum x Erianthus Maximus			
NC.132 x B.H.10(12)	1st Erianthus Nobilisation ...	1	—	—
	S. officinarum x S. spontaneum x S. barberi			
Co.413 x B.34104 ...	Noble x Local x Chunnee ...	3	—	0
B.45225 x Q.813 ...	,, x ,, x ,, ...	—	226	25
Trojan x Co.281 ...	,, x ,, x ,, ...	27	—	7
Trojan x B.34104 ...	,, x ,, x ,, ...	100	—	26

APPENDIX II.—*Continued*

Cross	Group	No. Planted In Field Nursery		No. Planted in First Year Seedling Trial
		Singles	Bunches	
R.333 x E.2412 ...	Noble x Local x Chunnee ...	108	67	54
R.333 x T.11 ...	,, x ,, x ,, ...	162	—	52
B.34102 x B.41227 ...	Noble x Glagah x Chunnee ...	136	—	7
B.35207 x P.O.J.2878	,, x ,, x ,, ...	330	—	85
B.4362 x B.51192 ...	,, x ,, x ,, ...	115	—	39
B.37161 x B.55E.2412	,, x ,, x ,, ...	193	292	60
Q.813 x J.32 ...	,, x ,, x ,, ...	96	200	62
J.14 x Q.813 ...	,, x ,, x ,, ...	115	215	0
J.31 x Q.813 ...	,, x ,, x ,, ...	18	—	0
J.32 x Q.813 ...	,, x ,, x ,, ...	122	115	0
J.34 x Q.813 ...	,, x ,, x ,, ...	130	26	1
J.36 x Q.813 ...	,, x ,, x ,, ...	39	—	1
J.1 x C.4153 ...	,, x ,, x ,, ...	67	—	10
B.37161 x H.44—3098	,, x ,, x ,, ...	13	—	6
Co.421 x B.5411 ...	Noble x Local x Glagah x Chunnee	—	346	106
H.32—8560 x Co.281 ...	,, x ,, x ,, x ,,	259	—	28
Co.413 x NCo.310 ...	,, x ,, x ,, x ,,	—	298	48
H.32—8560 x B.41211 ...	,, x ,, x ,, x ,,	318	—	123
H.32—8560 x B.43234 ...	,, x ,, x ,, x ,,	6	—	6
P.R.1000 x B.49119 ...	,, x ,, x ,, x ,,	297	629	48
H.32—8560 x B.49119 ...	,, x ,, x ,, x ,,	353	337	105
B.4362 x B.49119 ...	,, x ,, x ,, x ,,	—	700	122
H.32—8560 x B.34104 ...	,, x ,, x ,, x ,,	190	—	48
P.R.1000 x B.52298 ...	,, x ,, x ,, x ,,	238	—	49
B.3353 x B.34104 ...	,, x ,, x ,, x ,,	—	200	98
Pepe Cuca x B.41211 ...	,, x ,, x ,, x ,,	66	—	22
B.5012 x B.34104 ...	,, x ,, x ,, x ,,	86	—	30
Co.413 x B.4098 ...	,, x ,, x ,, x ,,	—	218	58
B.37161 x B.4098 ...	,, x ,, x ,, x ,,	—	398	180
B.40105 x B.41227 ...	,, x ,, x ,, x ,,	530	—	118
B.45137 x B.4098 ...	,, x ,, x ,, x ,,	11	—	9
B.4906 x B.4098 ...	,, x ,, x ,, x ,,	—	546	290
B.4906 x B.41227 ...	,, x ,, x ,, x ,,	—	400	107
B.37172 x Q.50 ...	,, x ,, x ,, x ,,	83	—	20
B.37161 x Q.50 ...	,, x ,, x ,, x ,,	87	161	81
P.R.1000 x B.4098 ...	,, x ,, x ,, x ,,	—	600	47
P.R.1000 x B.37193 ...	,, x ,, x ,, x ,,	262	—	36
B.4145 x B.49119 ...	,, x ,, x ,, x ,,	359	160	86
D.62/43 x B.46136 ...	,, x ,, x ,, x ,,	100	—	18
B.4373 x B.4744 ...	,, x ,, x ,, x ,,	187	—	26
F.36—819 x B.41211 ...	,, x ,, x ,, x ,,	373	168	202
B.5011 x B.47419 ...	,, x ,, x ,, x ,,	—	730	295
B.4547 x B.4098 ...	,, x ,, x ,, x ,,	—	176	39
B.51131 x B.4098 ...	,, x ,, x ,, x ,,	290	54	44
Trojan x B.4098 ...	,, x ,, x ,, x ,,	195	97	109
B.38233 x B.4744 ...	,, x ,, x ,, x ,,	59	—	18
B.5012 x B.52298 ...	,, x ,, x ,, x ,,	25	—	9
Trojan x CP.29—116	,, x ,, x ,, x ,,	472	—	63
Trojan x B.5387 ...	,, x ,, x ,, x ,,	7	—	1
P.R.1000 x B.47419 ...	,, x ,, x ,, x ,,	238	120	18
B.48330 x B.49119 ...	,, x ,, x ,, x ,,	443	—	91
Co.421 x B.4098 ...	,, x ,, x ,, x ,,	286	—	85
B.4906 x B .4744 ...	,, x ,, x ,, x ,,	—	135	35
B.4733 x B.47419 ...	,, x ,, x ,, x ,,	—	160	16
B.4145 x Co.290 ...	,, x ,, x ,, x ,,	360	—	88
B.3439 x B.34104 ...	,, x ,, x ,, x ,,	—	290	41
B.3439 x B.43235 ...	,, x ,, x ,, x ,,	61	—	21
B.51129 x B.4098 ...	,, x ,, x ,, x ,,	136	—	53

APPENDIX II.—*Continued*

Cross	Group	No. Planted In Field Nursery		No. Planted in First Year Seedling Trial
		Singles	Bunches	
M.134/32 x B.4098 ...	Noble x Local x Glagah x Chunnee	91	181	84
B.3439 x B.49119 ...	,, x ,, x ,, x ,,	180	174	58
B.3439 x B.51321 ...	,, x ,, x ,, x ,,	107	—	67
B.51311 x B.4788 ...	,, x ,, x ,, x ,,	256	68	58
B.5401 x B.4098 ...	,, x ,, x ,, x ,,	160	—	81
B.48209 x B.49119 ...	,, x ,, x ,, x ,,	230	—	37
B.4362 x B.4744 ...	,, x ,, x ,, x ,,	13	—	8
B.4214 x B.4744 ...	,, x ,, x ,, x ,,	75	—	25
B.42279 x B.49119 ...	,, x ,, x ,, x ,,	—	94	17
B.37161 x B.54193 ...	,, x ,, x ,, x ,,	1	—	0
B.37161 x B.47312 ...	,, x ,, x ,, x ,,	60	—	11
B.52D.25 x B.54U.113	,, x ,, x ,, x ,,	31	—	10
Co.421 x B.53R.321	,, x ,, x ,, x ,,	190	—	17
B.50184 x B.49119 ...	,, x ,, x ,, x ,,	—	112	29
H.32—8560 x NCo.310	,, x ,, x ,, x ,,	—	376	84
B.37161 x NCo.310 ...	,, x ,, x ,, x ,,	355	—	60
E.2412 x R.333 ...	,, x ,, x ,, x ,,	29	—	14
B.37172 x H.3 ...	,, x ,, x ,, x ,,	475	—	70
B.52321 x B.4098 ...	,, x ,, x ,, x ,,	9	—	5
B.51311 x B.4098 ...	,, x ,, x ,, x ,,	135	54	48
F.36—819 x B.34104 ...	,, x ,, x ,, x ,,	320	—	69
B.37172 x B.49119 ...	,, x ,, x ,, x ,,	217	—	29
B.51311 x H.44—3098	,, x ,, x ,, x ,,	216	—	51
B.3439 x B.50347 ...	,, x ,, x ,, x ,,	51	—	24
B.51311 x B.50347 ...	,, x ,, x ,, x ,,	13	—	4
Trojan x B.50347 ...	,, x ,, x ,, x ,,	396	91	68
B.5012 x C.12 ...	,, x ,, x ,, x ,,	113	—	67
Co.213 x C.12 ...	,, x ,, x ,, x ,,	197	—	37
B.4214 x B.54193 ...	,, x ,, x ,, x ,,	384	—	76
B.48330 x B.53227 ...	,, x ,, x ,, x ,,	14	—	7
B.51311 x B.53227 ...	,, x ,, x ,, x ,,	4	—	2
B.43380 x Comus ...	Noble x Local x Celebes x Chunnee	2	—	—
Ba.11569 x B.47177 ...	Noble x Local x Celebes x Chunnee	—	137	54
B.37172 x B.47151 ...	Noble x Glagah x Celebes x Chunnee	11	—	3
B.37161 x B.47151 ...	Noble x Glagah x Celebes x Chunnee	2	—	0
B.37161 x B.50377 ...	Noble x Local x Glagah x Celebes x Chunnee	14	—	7
B.43283 x B.46136 ...	Noble x Local x Galagah x Celebes x Chunnee	—	175	6
B.5082 x B.4098 ...	Noble x Local x Glagah x Celebes x Chunnee	7	—	4
B.4362 x B.50377 ...	Noble x Local x Glagah x Celebes x Chunnee	—	128	33
H.32—8560 x B.50377 ...	Noble x Local x Galagh x Celebes x Chunnee	638	90	216
B.43295 x NCo.310 ...	Noble x Local x Glagah x Celebes x Chunnee	96	—	6
B.43295 x Q.50 ...	Noble x Local x Glagah x Celebes x Chunnee	11	—	—
B.50370 x C.12 ...	Noble x Local x Glagah x Celebes x Chunnee	136	—	47
		13,390	9,690	5,165

APPENDIX II.—*Continued*

Cross	Group	No. Planted In Field Nursery		No. Planted in First Year Seedling Trial
		Singles	Bunches	
	S. officinarum x S. spontaneum x S. barberi x S. sinense			
B.5055 x B.45151 ...	Noble x Local x Glagah x Chunnee x Sinense	—	383	111
B.35207 x CP.38—34	Noble x Local x Glagah x Chunnee x Sinense	63	—	28
B.45137 x B.47258 ...	Noble x Local x Glagah x Chunnee x Sinense ...	272	—	29
B.45119 x B.47258 ...	Noble x Local x Glagah x Chunnee x Sinense	275	—	41
B.45154 x B.4744 ...	Noble x Local x Glagah x Chunnee x Sinense	—	204	35
P.R.1000 x B.45151 ...	Noble x Local x Glagah x Chunnee x Sinense	—	129	30
B.44341 x B.52107 ...	Noble x Local x Glagah x Chunnee x Sinense	66	—	11
B.39254 x Q.50 ...	Noble x Local x Glagah x Chunnee x Sinense	4	—	3
B.39254 x B.4744 ...	Noble x Local x Glagah x Chunnee x Sinense	170	—	36
B.44341 x B.45151 ...	Noble x Local x Glagah x Chunnee x Sinense	46	—	11
B.3439 x B.45151 ...	Noble x Local x Glagah x Chunnee x Sinense	—	800	193
B.44111 x B.49119 ...	Noble x Local x Glagah x Chunnee x Sinense	—	260	31
B.45220 x B.4744 ...	Noble x Local x Glagah x Chunnee x Sinense	197	—	40
B.45154 x B.34104 ...	Noble x Local x Glagah x Chunnee x Sinense	423	—	106
B.45152 x B.5401 ...	Noble x Local x Glagah x Chunnee x Sinense	1	—	0
Co.413 x B.45151 ...	Noble x Local x Chunnee x Sinense	5	337	26
B.45152 x B.34104 ...	Noble x Local x Chunnee x Sinense	7	—	4
B.4145 x B.45151 ...	Noble x Local x Chunnee x Sinense	95	167	62
Trojan x B.45151 ...	Noble x Local x Chunnee x Sinense	—	213	21
B.39254 x B.34104 ...	Noble x Local x Chunnee x Sinense	—	3	0
B.37161 x B.45151 ...	Noble x Local x Chunnee x Sinense	—	72	24
B.37161 x B.55B.2224	Noble x Glagah x Chunnee x Sinense	520	215	183
		2,101	2,826	1,025
	S. officinarum x S. spontaneum x S. sinense			
B.45220 x B.4604 ...	Noble x Glagah x Sinense ...	208	27	45
B.40272 x E.K.28 ...	,, x ,, x ,, ...	17	—	0
B.47183 x Ajax ...	Noble x Celebes x Sinense ...	44	—	15
B.39254 x B.41211 ...	Noble x Local x Glagah x Sinense	—	123	36
B.39254 x Pindar ...	Noble x Local x Glagah x Sinense	14	—	—
		283	150	96

Cross	Group	No. Planted In Field Nursery		No. Planted in First Year Seedling Trial
		Singles	Bunches	
	S. officinarum x S. spontaneum x S. barberi x S. robustum			
B.49388 x B.49119 ...	Noble x Local x Glagah x Chunnee x Robustum	900	—	109
B.4092 x M.Q.629 ...	Noble x Local x Glagah x Chunnee x Robustum	1	—	0
B.5652 x B.4098 ...	Noble x Local x Glagah x Chunnee x Robustum	87	—	43
B.45198 x C.12 ...	Noble x Local x Glagah x Chunnee x Robustum	217	—	63
B.49170 x Ajax ...	Noble x Glagah x Chunnee x Robustum	164	—	21
B.4145 x H.37—1933	Noble x Glagah x Chunnee x Robustum	—	580	153
B.35207 x B.50G.3 ...	Noble x Glagah x Chunnee x Robustum	62	—	2
B.47155 x B.49119 ...	Noble x Local x Glagah x Celebes x Chunnee x Robustum ...	537	48	128
		1,967	628	519
	S. officinarum x S. spontaneum x S. robustum			
B.3439 x B.51242 ...	Noble x Glagah x Robustum	—	186	131
B.49281 x E.K.28 ...	„ x „ x „ ...	2	—	0
		2	186	131
	S. officinarum x S. spontaneum x S. sinense x S. robustum			
B.55B.4213 x B.53G.33 ...	Noble x Glagah x Sinense x Robustum	68	—	12
	Polycross			
B.41211	C.290, Pindar, B. 4098 ...	3	—	—
Co.290	B.41211, B.4098, Pindar ...	27	—	—
		30	—	—
	Grand Totals ...	19,998	14,947	7,686

APPENDIX III.

B.59′ SERIES

Details of field and final selections from the First Year Trial

Cross		No. Planted	No. Field Selected	% Field Selection	No. Final Selection	% Final Selection
Ba.11569	x B.47177	6	1	17	—	—
Ba.11569	x B.52P.121 ...	2	—	—	—	—
Ba.11569	x B.53317	5	1	20	—	—
Ba.11569	x B.54J.11 ...	17	1	6	1	6
Ba.11569	x Comus	91	3	3	2	2
Ba.11569	x CP.31—517 ...	50	2	4	2	4
Ba.11569	x CP.38—34 ...	9	2	22	1	11
Ba.11569	x 32 MQ.629 ...	57	3	5	3	5
B.3172	x B.41211	22	1	5	—	—
B.3365	x B.45151	11	1	9	1	9
B.3365	x B.49119	125	14	11	10	8
B.3439	x B.37193	86	9	10	5	6
B.34102	x B.45151	12	2	17	1	8
B.34102	x P.O.J.2878 ...	6	—	—	—	—
B.35206	x NCo.310	116	4	3	4	3
B.35207	x B.53218	155	8	5	5	3
B.35207	x B.53267	7	1	14	1	4
B.35207	x P.O.J.2878 ...	142	6	4	5	4
B.35247	x B.46364	91	4	4	2	2
B.35247	x H.37—1933 ...	28	1	4	1	4
B.37161	x B.3337	4	—	—	—	—
B.37161	x B.4098	144	14	10	6	4
B.37161	x B.4327	6	1	17	—	—
B.37161	x B.4362	33	—	—	—	—
B.37161	x B.4409	11	2	2	—	—
B.37161	x B.47419	63	5	8	3	5
B.37161	x B.49119	42	5	12	3	7
B.37161	x B.51242	30	3	10	3	10
B.37161	x B.51E.25 ...	11	2	2	—	—
B.37161	x Co.270	9	1	11	1	11
B.37161	x CP.44—155 ...	34	2	6	2	6
B.37161	x Pindar	18	—	—	—	—
B.37161	x P.O.J.2878 ...	13	3	23	3	33
B.37161	x Q.28	6	1	17	1	7
B.37172	x B.41211	62	1	2	1	2
B.37172	x B.4362	9	1	11	1	11
B.39157	x B.4098	15	—	—	—	—
B.39157	x B.47419	14	2	14	2	14
B.39254	x B.34104	5	1	20	1	20
B.39254	x B.49119	18	1	6	1	6
B.39254	x B.50377	5	2	40	2	40
B.39254	x NCo.310	22	7	32	5	23
B.4145	x Co.270	7	1	14	1	14
B.4145	x NCo.310	6	1	17	1	17
B.4214	x B.3337	71	6	8	3	4
B.4214	x B.4098	116	10	9	7	6
B.42279	x B.41211	43	5	12	4	9
B.42304	x B.37193	103	11	11	7	7
B.42304	x B.49119	82	2	2	1	1
B.4362	x B.39220	20	1	5	1	5
B.4362	x B.4098	117	6	5	5	4
B.4362	x B.43235	41	4	10	1	2
B.4362	x B.45236	187	8	4	4	2
B.4362	x B.49198	7	3	43	2	28
B.4362	x B.52178	17	—	—	—	—
B.4362	x C1.41—223 ...	55	2	4	2	4

APPENDIX III.—(*Continued*)

Cross	No. Planted	No. Field Selected	% Field Selection	No. Final Selection	% Final Selection
B.4362 x Co.281	23	2	9	1	4
B.4362 x Co.419	50	1	2	1	2
B.43295 x B.41227	7	1	14	—	—
B.43349 x B.47320	132	7	5	3	2
B.43358 x B.51353	46	8	17	5	11
B.4455 x B.603	32	2	6	2	6
B.4457 x B.417	58	3	5	2	3
B.44233 x B.603	62	4	6	3	5
B.44305 x B.41227	38	5	13	2	5
B.4587 x B.4098	2	—	—	—	—
B.45121 x B.4362	16	—	—	—	—
B.45137 x B.34104	1	—	—	—	—
B.45137 x B.53362	60	7	12	5	8
B.45152 x B.5032	10	3	30	2	20
B.45152 x B.5301	7	4	57	1	14
B.45154 x B.46364	104	4	4	2	2
B.45170 x B.41227	49	4	8	2	4
B.45170 x B.49119	15	3	20	3	20
B.45198 x B.603	18	1	6	—	—
B.46384 x B.43235	9	1	11	—	—
B.46384 x P.O.J.2878 ...	4	—	—	—	—
B.47399 x B.49119	4	—	—	—	—
B.4862 x B.47419	23	—	—	—	—
B.48106 x B.4098	32	—	—	—	—
B.48330 x B.4098	69	1	1	1	1
B.48307 x B.34104	26	4	15	1	4
B.49282 x B.34104	13	1	8	—	—
B.49353 x B.41227	70	8	11	6	9
B.49372 x B.42231	65	2	3	—	—
B.5041 x B.53B.222 ...	20	4	20	2	10
B.5055 x B.45151	30	4	13	3	10
B.50151 x B.41211	51	4	8	3	6
B.5124 x B.3337	18	1	6	1	6
B.51244 x B.45151	7	1	14	1	14
B.51311 x B.4744	47	8	17	5	11
B.51311 x B.49119	61	10	16	6	10
B.52242 x B.4744	5	—	—	—	—
B.52371 x B.41227	58	4	7	3	5
B.5336 x B.4098	3	2	67	1	33
B.53165 x B.4744	29	5	17	4	14
B.53B.113 x B.4098	1	—	—	—	—
B.53B.151 x B.4098	22	2	9	1	5
B.53B.223 x B.4098	19	1	5	1	5
B.53B.442 x B.41211	74	2	3	—	—
B.53C.32 x B.54U.112 ...	34	—	—	—	—
B.54U.131 x B.52D.25 ...	55	5	9	4	7
Co.360 x NCo.310	40	3	8	3	8
Co.413 x B.41211	105	2	2	1	1
Co.413 x B.49119	11	3	27	3	27
Co.421 x B.4098	8	—	—	—	—
Co.421 x B.4995	141	3	2	3	2
Co.421 x B.5012	23	3	13	3	13
Co.421 x B.54U.134 ...	14	—	—	—	—
H.32—8560 x B.41227	49	2	4	2	4
H.32—8560 x P.O.J.2878 ...	188	15	8	8	4
M.134/32 x B.41227	75	7	9	3	4
M.134/32 x B.4744	16	1	6	—	—
Otaheite x B.4098	19	3	16	2	11
P.O.J.2878 x B.34104	23	—	—	—	—
P.O.J.2878 x B.41227	166	8	5	5	3

APPENDIX III.—(*Concluded*)

Cross	No. Planted	No. Field Selected	% Field Selection	No. Final Selection	% Final Selection
P.O.J.2878 x B.44279	11	1	9	1	9
P.O.J.3016 x B.34104	13	—	—	—	—
P.O.J.3016 x B.41227	58	2	4	1	2
Trojan x B.4098	245	10	4	10	4
A.3 x Self	10	2	20	2	20
B.12 x Self	29	2	7	2	7
C.11 x C.13	22	1	5	—	—
G.33 x Self	7	2	29	1	14
H.1 x Self	2	1	50	1	50
P.13 x Self	3	1	33	1	33
R.332 x Self	4	1	25	—	—
U.112 x Self	15	2	13	1	7
U.131 x Self	11	1	9	—	—

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